MESUTRONIC

Metal Detection made in Germany

Translation of the original-

USER MANUAL

METRON 05 C, CI, CO, CR, D, S, VT

GB

Version: GB -MN5.2-M0-002 ■ Mode: 0
Date: 12.08.2013 ■ Order number:

Please read user manual before you start working on the machine

CE

Dear customer,

to begin with, we would like to thank you for your confidence in our metal detection system.

Prior to switching the system on, please read the user manual completely as this provides you with the expertise necessary for optimum operation and adjustment of the system according to your requirements.

If, contrary to expectations, you have any problems in operating your system, the MESUTRONIC-Team and our contractors will be able to assist you at any time.

The MESUTRONIC-Team is at your disposal from Monday until Friday between 8 a.m. and 6 p.m., tel. +49 9927 / 94 10-0 or fax +49 9927 / 17 32. Outside our office hours, you can contact us, at any time, via MESUTRONIC-Helpline. The respective phone number can be retrieved from our answer machine. Please do not hesitate to contact us.

If a demonstration on site is required, we will respond as soon as possible offering national and international services.

Enjoy your MESUTRONIC-System and a metal-free time, yours

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General information

1

Information about the operating manual

This operating manual provides you with important information about handling the machine. The prerequisite for safe working is adherence to all instructions given for safety and action.

Beyond that, the local rules for the prevention of accidents and general safety regulations applicable to the place of use of the machine must be adhered to.

The operating manual is part of the product; it must be kept near to the machine and must be accessible to personnel at all times.

Copyright

The operating manual must be treated confidentially. It is intended exclusive for those persons who deal with the machine. It is forbidden to give the operating manual to third parties without the written permission of the manufacturer.

NOTE!
The specifications, texts, drawings, pictures and other representations contained in the manual are protected by commercial property rights. Any misuse is punishable by law.

Explanation of symbols

The following symbols are used in this operating manual
(all symbols conform to DIN 4844 and/or BGV A 8 standards):

Warning symbols: **Directive symbols**

 Hazardous voltage	 This warning symbol designates potential hazards. Non-observance of this symbol can lead to injuries, even to death.	 Prohibited for persons fitted with a cardiac pacemaker
 Danger of injury to hands	 Warning of harmful or irritant substances	

Mandatory signs:

 Take particular care	 Switch off before carrying out work	

Warranty and liability

We are liable for defects in the unit manufactured by us in accordance with our terms and conditions of business. All claims are voided if damage occurs due to improper operation, repairs or interventions by persons not authorised by the manufacturer or the user, or the use of accessories and spare parts which not suitable for our unit.

Transport

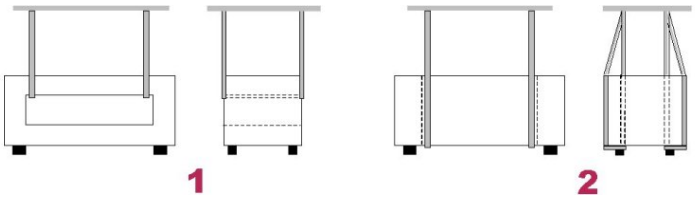
When transporting the machines, you must observe the following points:

- When exceeding the country's legally prescribed maximum weight limits for people moving goods, lifting devices must be used!
- Mount the lifting devices in accordance with the following drawing! (check your coil type!)
- When mounting the eye bolts, please take care that they fit snugly onto the bearing face. Loads that run diagonal to the ring face are not allowed.
- Mounting the lifting devices and transport may only be carried out by trained and authorised staff!
- During transport, the safety regulations in force must be observed!

Mounting the C, CI-Coil

1. Horizontal

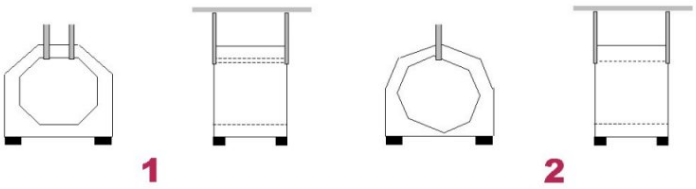
2. Vertical



Mounting the CO-Coil (only horizontal)

1. Style 1

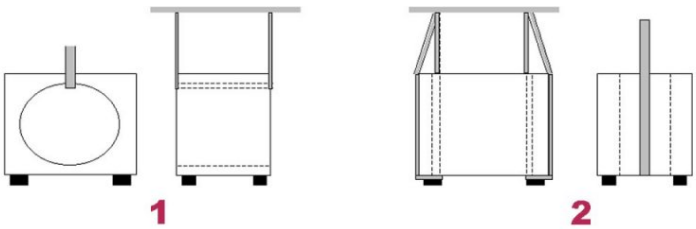
2. Style 2



Mounting the CR-Coil

1. horizontal

2. vertical

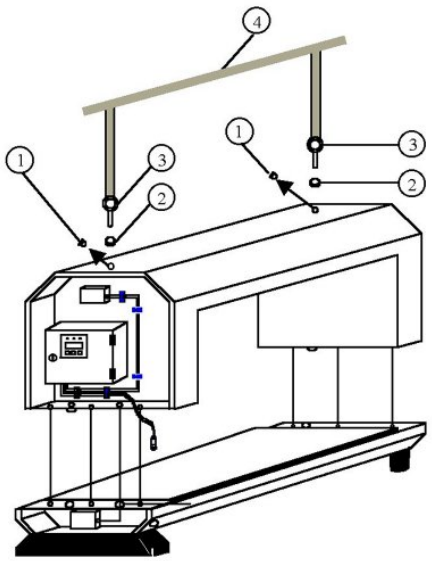


Mounting the D-Coil

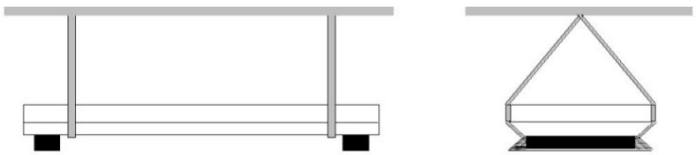
Upper part, or upper and lower part mounted:

- Remove the plug (1)
- Mount the washer (2) and the eye bolt (3)
  The washer and the eye bolt can be ordered via the spare parts list. **They are not included in the scope of delivery!**
- Fix the lifting device (4) to the eye bolts (3)
- Remove eye bolt (3) and put plug (1) back in

the lower part (see Mounting the S-coil)



Mounting the S-Coil



Installation

Requirements for the place of installation:

- Sufficient stability and load-bearing capacity of the substrate
- Please consult the manufacturer if the position is not horizontal

Storage

- The place of storage must be free from direct influences of the weather (frost, wetness, direct exposure to the sun).
- Place of storage in dust-free, closed rooms.
- Place of storage free from condensed water, acids, alkalis and other corrosive materials (vapours of these materials)
- Storage in the packed condition
- The adherence to the storage conditions is to be checked at regular intervals.

In the event of non-adherence to the above conditions, no warranty claims can be accepted for any technical defects caused by improper storage.

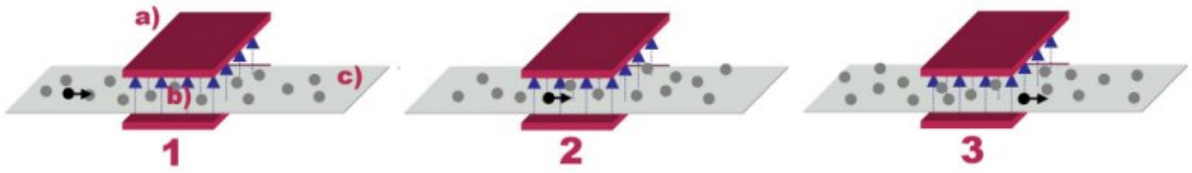
Disposal

If no agreement has been reached with regard to the taking back or disposal of the machine, dismantled components should be recycled following proper dismounting.

- Dispose of components according to the applicable laws/regulations of the user's country.
- Used substances and materials (greases, oils, cleaning agents or solvents, etc.) are to be disposed of according to the legal regulations.

Operating principle

The following shows the simplified principle of a metal search detector, with an example of a conveyor belt application. The shape and look of your application may differ, but the principle is the same.



a) Metal detector
b) Electromagnetic field
c) Product line

Metal detection

1. The seeker head creates and evaluates an electromagnetic field with the help of transmitter and receiver coils.
2. If a metal body enters the field, the signal indication display deflects in one direction.

see too chapter **Operation**

3. If the metal body leaves the field, the display deflects in the opposite direction.

If both switching thresholds are reached, metal is detected.

If metal is detected, several outputs, depending on your configuration, can be used to query the events: At least one Relay and a 24V (output A1) are available for your queries.

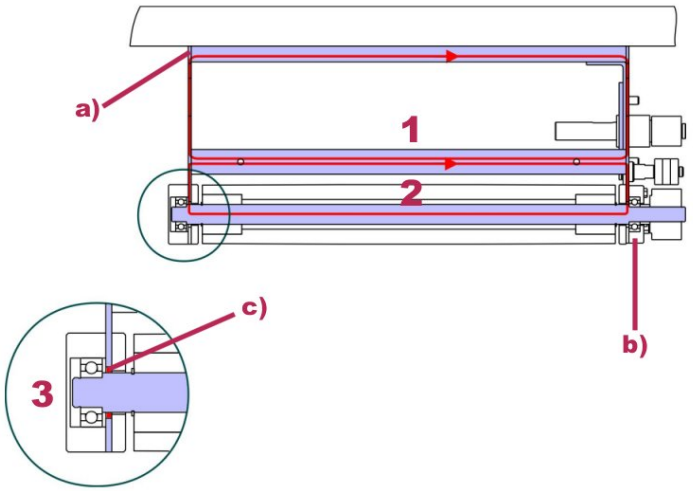
General notes on metal detection

Electro-magnetic short circuits

Certain metal frame constructions in conveyor belt frames (see drawing) and suspensions (e.g. castors, cross-bars, adaptor plates) can act as an electro-magnetic loop in the vicinity of the metal detector, affecting the magnetic field of the metal detector. Closed conductive loops must either be welded tight, or interrupted, e.g. with unilateral isolation.

Example:

a) Conveyor belt frame
b) Conveyor belt motor
c) Isolation



1. If the crossbar is permanently welded, the electromagnetic effect on the metal detector remains constant and does not negatively affect the field of the metal detector.

If the crossbar is only bolted, a constantly conducting connection cannot be guaranteed. The metal detector is negatively affected by the changing conductor loop.

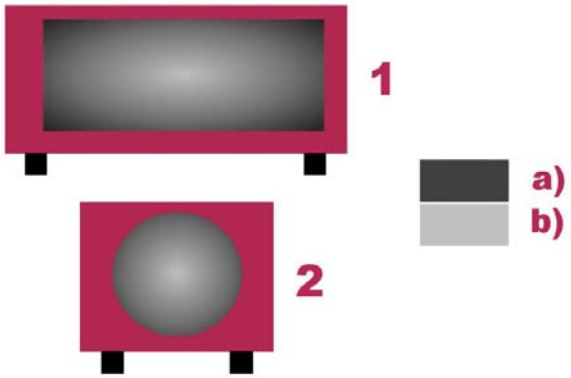
2. Rollers and moving parts that form a conductor loop must be insulated at one end (see fig. **3**.), in order to interrupt the conductor loop.

Electrostatic discharges

Prevent at all cost electrostatic discharges to the metal detector and surrounding construction components using the appropriate earthing. Electrostatic discharges can cause false signals and at worst, destroy the analysis electronics.

Differences in sensitivity within the outlet opening

Please note, that the detector coil does not create a homogeneous electromagnetic field. As a consequence, differences in sensitivity occur in the outlet opening. The least sensitive part of the detector is in the middle of the outlet opening.



Sensitivity distribution taking the example of a C-coil (**1**) and a CR-coil (**2**):

a) Area of highest sensitivity

b) Area of lowest sensitivity

Sensitivity differences of different metal types

Please note, that different metal types influence the electromagnetic field to a different degree. Please read the metal-type dependent maximum sensitivity degrees in the data sheet.

Position-dependency of the metal parts

Metal detection can be dependent on the position and orientation of the metal part, depending on the shape of the metal part. The maximum sensitivity values of the data sheet are tested with ball-shaped test parts. Generally speaking, all metal parts that have at least the same diameter as the balls used for the data-sheet values can be detected with certainty, irrespective of position and orientation.

Testing at regular intervals

Normally, errors of the detector itself are recognized by the self-monitoring system. However it cannot be excluded that errors may occur which are not detected. Changes in the environment of the detector (e.g. new machines) can influence the function of the detector.
For this reason, settings and function of the metal detector must be checked at regular intervals with suitable test equipment.

Environmental and weather influences

The metal detector has to be protected against environmental and weather influences (direct sun, wind, frost). The detector has to be especially protected from direct or indirect insulation when heating up is above the allowed temperature. High surface temperatures can lead to false detections and destruction of the metal detector in the worst case. A suitable protection device must therefore be provided (do not use metal walls or roofing covers made from metal!)

Operation of the device as provided

The device only serves for detecting metal in flight conveyors. The following products are excluded:

- **those contained in metallic or partially metallic casings,**
- **electrically conductive products**
- **products containing desired metal constituents.**

Since these products could possibly disturb the sensitivity of the metal detector, they may only be examined after consulting the manufacturer beforehand.

This device may not be operated

- **in areas with explosive hazards (customized version available),**
- **outside the stated protective system,**
- **outside the permitted temperature range**

Operating the device in an improper way can lead to damages at the device and also to injuries or the death of persons.

Any structural change of the device may only be effected after consent and prior inspection of the manufacturer.

The data provided in the manual regarding operation, maintenance have to be observed. Works at the metal detector may only be carried out by trained and authorized personnel.

Contents of the operating manual

Each person who is assigned to work on or with the machine must have read and understand the operating manual before commencing any work on the machine. This also applies if the person concerned has already worked with such a machine or a similar machine or has been trained by manufacturers.

Modifications and conversions of the machine

To avoid hazards and to ensure optimum performance, the machine may neither be modified nor converted nor may attachments be made to it unless expressly permitted by the manufacturer. Only original spare parts and accessories from the manufacturer may be used.

Duties of the operating company

The machine is used in an industrial area. The company that operates the machine is therefore subject at least to the legal health and safety requirements in the country of use.

Apart from the notes in this operating manual concerning health and safety at work, the regulations for safety, accident prevention and environmental protection applicable to the place of use of the machine must be adhered to. The following applies in particular here:

- **The product fulfils the CE marking requirements within the machine limits. The company that operates the machine is solely responsible for implementing the interfaces to the surroundings and the fixings in a safe manner, taking into account relevant regulations and directives. The machine may be put into operation only if it meets the safety requirements!**
- Assign only trained or instructed personnel.
- Clearly define the responsibilities of the personnel for the installation, operation, setup, maintenance and repair of the machine.
- The manual must always be kept at the place of use of the machine where it is accessible to all persons who operate the machine.
- Trainees may only work under the supervision of already trained personnel. New personnel must receive the same training as those personnel who have already been trained
- The operating company is responsible for defining the protective equipment that is necessary in order to make safe working possible.
- Provide the personnel with all necessary protective equipment.
- Check regularly that personnel are working in a safety-conscious manner.
- Keep all safety and danger notices on the machine complete and in a good, legible condition. **Danger of injury due to illegible or missing symbols!**

Duties of the personnel

Danger of injury if personnel are not sufficiently qualified to work on the machine!
Inappropriate handling can lead to serious injuries and material damages.

Therefore:

- Allow only the persons named in the respective chapter to perform special tasks.
- Personnel assigned to work on the machine must have read and understood the operating manual before commencing work.
- Observe all legal and basic regulations for health and safety and accident prevention when working.
- Observe all safety and danger notices on the machine
- In case of malfunction, stop the machine immediately and secure it. Have faults rectified immediately.
- Observe the safety regulations applicable to the product when handling oils, greases and other chemical substances. Use the necessary personal protective equipment.

All persons concerned with the assembly, commissioning, operation, maintenance and repair of the metal detector unit must be correspondingly qualified and trained.

Persons **Activity**	**Specially trained personnel**	**Personnel under instuction**	**Personnel with job-Specific training (mechanical/electronic)**
Transport	*	--	--
Commissioning	*	--	--
Fault-finding and repair	--	--	*
Adjustment, equipping	*	--	*
Operation	--	*	--
Maintenance	--	--	*
Disposal	*	--	--

Key: * = allowed -- = not allowed

Hazards related to this metal detection equipment:

A risk / hazard analysis has been carried out on the metal separator with subsequent safety check and safety acceptance. In the case of misoperation or misuse, there is a danger of injury to, or death of operators, maintenance personnel and others, damage to the metal detection equipment and the user's other property, and reduced efficiency of the equipment.

Safety and usage notices:

The following symbols have been applied to the equipment to indicate hazards which cannot be eliminated via structural measures:

WARNING!
Danger of injury due to illegible or missing symbols!
Keep all safety and danger notices on the plant complete and in a good, legible condition.

Symbol	Description	Location
	Hazardous voltage	Control and evaluation unit

Please take particular notice of the following residual hazards:

Hazard	Activity	Dangerous part	Solution
 Equipment weight	Transport / Removal	Complete equipment	Transport of the plant with suitable and approved lifting appliances by trained personnel. Observe applicable safety regulations.
 Danger of plant tipping	Set-up/installation, cleaning, decommissioning/disassembly	Complete equipment	Mount plant securely on mounting holes.
 Danger of injury to hands	Assembly	Complete equipment	Mounting only by trained and authorised personnel

 Hazardous voltage	All operating modes	Electronic cabinet, pneumatic cabinet	Keep the covers of the electronic and pneumatic cabinets closed
 Danger due to pressurised hot water	Cleaning with steam jet	Complete equipment	Wear suitable protective clothing when cleaning with a steam jet. Observe the manufacturer's safety instructions. **Observe protection class of the plant.**
 Danger of substances hazardous to health or irritants	Cleaning with cleaning agents	Complete equipment	Wear personal protective equipment and observe the cleaning agent manufacturer's instructions.
 Warning of visual or acoustic signal	All operating modes	Warning device (alarm)	Instruction of personnel on existing warning devices
 Prohibited for persons fitted with a cardiac pacemaker	Normal operation	Complete equipment	Persons fitted with a cardiac pacemaker (or other implanted medical aid) must not work on this machine.
	Generally, before cleaning or repairing the equipment, it must be switched off, made safe against accidental switch-on, the air pressure released and the conveyor belt stopped. The switch outputs should be checked for external voltages.		

Actuation

3

General

It is our company's goal to ship the metal detector to the customer with as many pre-configured settings as possible. If the machine is shipped with factory default settings, it should be noted, that the factory defaults are the best possible compromise between maximally attainable detection precision and lowest possible sensitivity to interference. The data sheet sensitivities are achieved with sensitivity settings between 90 and 100%.

In order to adjust the settings according to one's own requirements, the following plan will outline how to go about setting up the machine. Only the steps are explained, for a thorough explanation of the menu items, you should consult the operating manual.

Safety procedures before taking the device into operation

Before actuating the metal detector at least the following parts of the device must be checked:

- Is the device damaged anywhere?
- Are the electric ports and mains undamaged ?
- Are all protective covers fitted and free of damage?
- Are all pneumatic supplies and mains undamaged (if installed)?

The device can start if **everything is perfect.**

Danger due to incorrect assembly and commissioning!

Assembly and commissioning require trained technical personnel with sufficient experience. Errors made during assembly can lead to life-threatening situations or result in considerable material damages.

1. Clean the metal detector

If the product is not allowed to have contact with foreign matter, all surfaces having contact with the product must be cleaned before start-up operation.

Please follow the safety instructions!

see chapter **Maintenance and cleaning → Cleaning**

2. Assemble metal detector

Assemble the metal detector according to the information provided in the chapter „Assembly“.

see chapter **Assembly**

3. Connecting the 24V switching exits and relays

Connect the 24V switching exits and relays as needed. Please follow the indications in the chapter **Set-up**.

see chapter **Assembly → Connection**

4. Connect power supply

see chapter **Assembly → Connection → Supply voltage**

The metal detector is now fully assembled and connected.
All further points are concerned with the most important adjustments that should be made to your machine in order to ensure trouble-free operation with the maximum possible sensitivity.

5. Switch metal detector on

Having assembled the detector mechanically, as a first step it is taken into operation. Under this condition the detector is only subject to external influences (peripheral disturbances). If at this point faulty responses are triggered, you have to try and find the source of the disturbance and to correct the error. For this switch off all machines (motors, actuation, etc.) in the direct surroundings of the metal detector so that the metal signal of the metal detecting device stays within the triggering range. As a next step the device is taken again into operation step by step.

After each step control the measure signal in order to locate the disturbance, that causes an increased noise level. If a noise suppression is not possible, remains only an increase of the detection threshold, until there are no more false alarms.

see chapter **Adjustment → Operating level 1 → Sensitivity**

6. Activate production- and transporting device

As a next step the production and transporting device is taken into operation without loading products. In this state the influence of the transporting device on the metal detector becomes evident. Here also applies: If there should be incorrect triggers try to locate the cause of the disturbance and suppress it. For this, take the production line into operation as mentioned above, step by step.

Contrary to peripheral disturbances that often need very high efforts to suppress them in this case a solution should be easily found.

Temporarily the sensitivity can be reduced until there are no more incorrect triggerings.

see chapter **Adjustment → Operating level 1 → Sensitivity**

7. Start complete production line

Now start the complete production line. For the set-up-step you should, if possible, use only metal-free products. The further Stepps depends on the current situation. If there are metal events while a metal-free product is passing through the coil, you should continue with the following point, otherwise you may skip the following point.

8. „Learn product“

Your product is conductive and therefore influences your metal detector without metal being existent in your product.

Follow the instructions as in „ **Learn product manual**“, in order to counterbalance the “product effect”

see chapter **Adjustment →Operating level 2 → Learn product**

9. Optimize sensitivity settings

Note:
The lower the detection threshold is set, the higher the detection sensitivity will be, but the susceptibility to false triggering will also be higher

see chapter **Adjustment → Operating level 1 → Sensitivity**

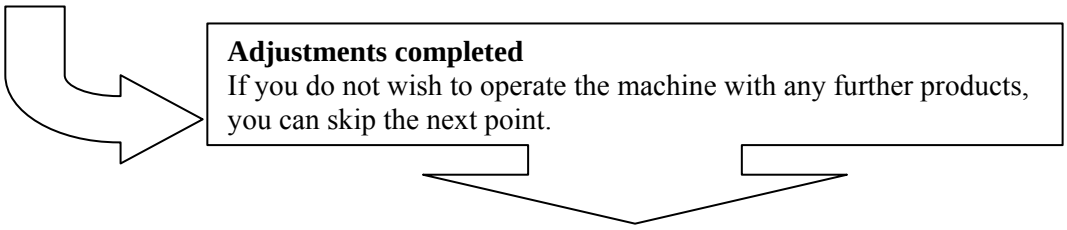
10. Change name of the product (recommended)

Now you can enter a name for the product. This is most important if you use several different products or product groups in connection with the metal detection device.

see chapter **Adjustment → Operating level 2 → Parameter set**

11. Adapting the reject parameter(if need be)

see chapter **Adjustment → Operating level 2 → Reject parameter**



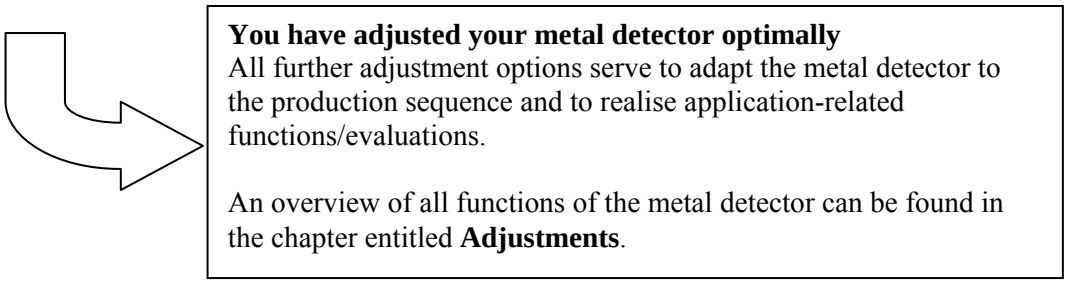
Adjustments completed
If you do not wish to operate the machine with any further products, you can skip the next point.

12. „Change products“

You can save up to different products (parameter sets). In connection with the name sensitivity and separating time are saved. In order to adjust settings for a new product, you have to change product.

see chapter **Adjustment → Operating level 2 → Parameter set**

Repeat the points **“Start complete production line”** to **„Change products“**until all products/parameter sets that are operated together with the metal detecting device are configured.



You have adjusted your metal detector optimally
All further adjustment options serve to adapt the metal detector to the production sequence and to realise application-related functions/evaluations.

An overview of all functions of the metal detector can be found in the chapter entitled **Adjustments**.

Assembly

4

Please note when assembling your detector the following assembly instructions in order to ensure perfect operation.

Installation guidelindes

Electronics

Connect the metal detector to a clean, constant voltage power supply.

Voltage fluctuations can cause false trippings. Therefore, a constant voltage transformer (AC line conditioner) is recommended. In order to check if false tripping is caused by voltage fluctuations you can temporarily supply the metal detector with a UPS (Uninterruptible Power Supply, direct, independent power supply as used for Computers). Please, do not forget to plug off the input cable of the UPS to separate it from the AC line.

Do Not install the control panel near MCC's or control panels of other machinery.

Stray fields of motor lines and high power cables can trigger faults. Be especially aware of frequency inverters and DC Drives as they can emit high frequent electromagnetic fields that might cause false trippings of the metal detector. Please follow the guidelines of the manufacturer of the motor drive. Especially take care of using screened motor cables, AC Filters and make sure that the ground connection is correct.

Run the transmitter and receiver cables to the metal detector separately from live wires.

The detector cables can catch noise, especially when they are close to motor lines or high power cables. To improve the screening of the cables, solid metal conduits with a good ground connection (best welded) are recommended. Please do not connect the conduits to the metal detector or at least use plastic fittings when connecting flexible conduits to the cabinet or transmitter and receiver boxes of the metal detector. Be aware of ground loops. Both cables can be run in the same conduit.

Do not disconnect the metal detector from the power if possible.

A constant, uninterrupted power supply enables more sensitive adjustments and prolongs lifetime of electronic components. Powering the unit on and off causes it to recalibrate (8 seconds) during which time metal will not be detected.

When welding at the construction where the metal detector is mounted, disconnect the metal detector from the power supply and do not use the control panel mounting surface as a ground.

Warding near the metal detector will lead to false trippings.

Vibration less using of the control panel

Mount the control panel on a vibration free surface. Vibration can cause premature electronic component failure.

If the electronics casing is mounted onto other machine parts, there is a danger of causing an earth connection loop, which can lead to malfunctions.

In such cases, the electronics casings should be isolated (suitable plastic panes and isolating materials can be found among spare parts for installation).

All cables must be shielded.

The shield must be connected face-to-face on the housing; ideally by means of an EMC screw.

Detector general

Be careful when you have more than one metal detector in operation!

If several metal detectors are installed in immediate proximity, they might Interfere with each other when running at the same detection frequency (frequency overlaps).If we know in advance that you have more than one detector in operation, we do already adjust the detectors to different frequencies. Should there be frequency overlaps, you can adjust one detector to side frequency.

see chapter **Adjustments → Operating level 2 → Frequency → Secondary frequency**

Please observe the required minimum distances. For closed tunnel detectors type C, CI and CR: minimum distance = 10 x LH (LW for type CR), if the detectors are installed parallelly in one row. For divisible tunnel detectors type D and single surface detectors type S: minimum distance= 15 x LH (SB for type S), if the detectors are installed parallelly in one row. The minimum distances may be lower if you work with different frequencies. Please consult our sales or application department.

LH = Aperture Height LW = Aperture Width SB = Detector breadth

Do not install the detection coil inside a strong electromagnetic field. (especially if in the direct surroundings of the seeker head there are strong load variations at other electronic devices).

Interferences can trigger faults. Specifically, fields lying exactly within the operating freqency of the detector can lead to frequency overlapping and hence to false tripping.

Pay attention to the metal free zone (MFZ) of the metal detector.

Do fixed, non-moving metal parts outside the metal-free zone have little influence on the metal detector's function. Metal parts changing their distance to the detector (levers, swivel arms…), however, might cause problems within the metal free zone, please use electrically non-conductive material only, e.g. wood or plastics. Please keep in mind that the use of a plastics slide plate may promote the formation static charges.

see chapter **Assembly → Tips for Set-up**

Vibration less using of the detector coil (all, except "VT" type).

Higher sensitivities can be attained and maintained if the operating conditions are optic mal. Ensure the coil is mounted to a structure that is stationery at all times.

Take steps to avoid the detector cables moving back and forth.

Please fasten the transmitter and receiver cables with the aid of clips so that they cannot move. Strong movement of the cables back and forth can lead to false triggering.

Eliminate loose metal to metal connections near or within the detection field.

Intermittent metal contact from components such as roller axles, bolted structural connections of the conveyor frame, loose grids from access platforms or broken welds can cause false reject signals, especially at high sensitivity settings. In order to avoid creating intermittent magnetic loop contacts, please isolate metal parts from one another or weld them together. Bolted ground connections will not solve this problem.

see chapter **Introduction → General notes on metal detection**

Pay attention to the maximum installation batter of the search head

You can take the maximum installation batter from the datasheet. For larger batter, please contact the manufacturer before installing the unit.

Please clean the conveyor belt (of belt conveyors) regularly.

Metal impurities cause fault detections. Please make sure the belt runs centrically on the rollers and nothing rubs on the belt.

Pay attention to an electrical insulated installation.

The mounting feet of the detector provide an electrical insulation, do not remove them.

Do not use anti-electrostatic (or electrically conductive) belt material.

Anti-electrostatic belts are conductive and cause an effect similar to metal in the metal detector.

Depending on the relevant application, a conveyor belt appropriate for the metal detector must be chosen. The conveyor belt should have a so-called finger coupling. Furthermore, glue containing metal particles must not be used for connecting the belt.

Do not touch the sensor/coil surface of the detector.
(not VT-Coil)

Mechanical contacts may cause detection errors. Keep the surface free of debris.

The frame must be manufactured with appropriate stability.

Loose attached parts, in particular loose transverse connecting parts such as bracing struts, bolted discharge plates, cover plates etc. can cause considerable interference. Screwed connections should be dispensed with entirely in this area if possible – welding is better. Insulate the parts on one side wherever screwed connections are absolutely necessary.

Power rolls, deflection rollers and snub pulleys are also possible sources of interference, as the electrical contact is submitted to large variations caused by damaged or bad bearings.

The same applies to swivelling belt strippers. These parts should always be insulated on one side. **Please note:** Bridging bad contacts with earth band or wire will **not help!**

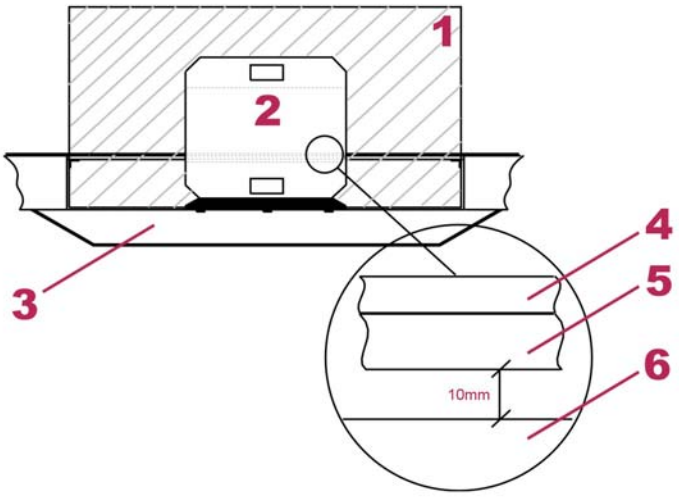
see chapter **Introduction → General notes on metal detection**

When welding at the construction where the metal detector is mounted, disconnect the metal detector from the power supply and do not use the control panel mounting surface as a ground.

Welding in the surroundings of the detector will trigger faults.

Tips for set-up

General



1. Metal free zone
2. Metal detector
3. Belt frame
4. Conveyor belt
5. Sliding plate
6. Sensor surface

The product, conveyor belt and sliding plate must not touch the sensor surfaces (this is not true for VT/SL coils).

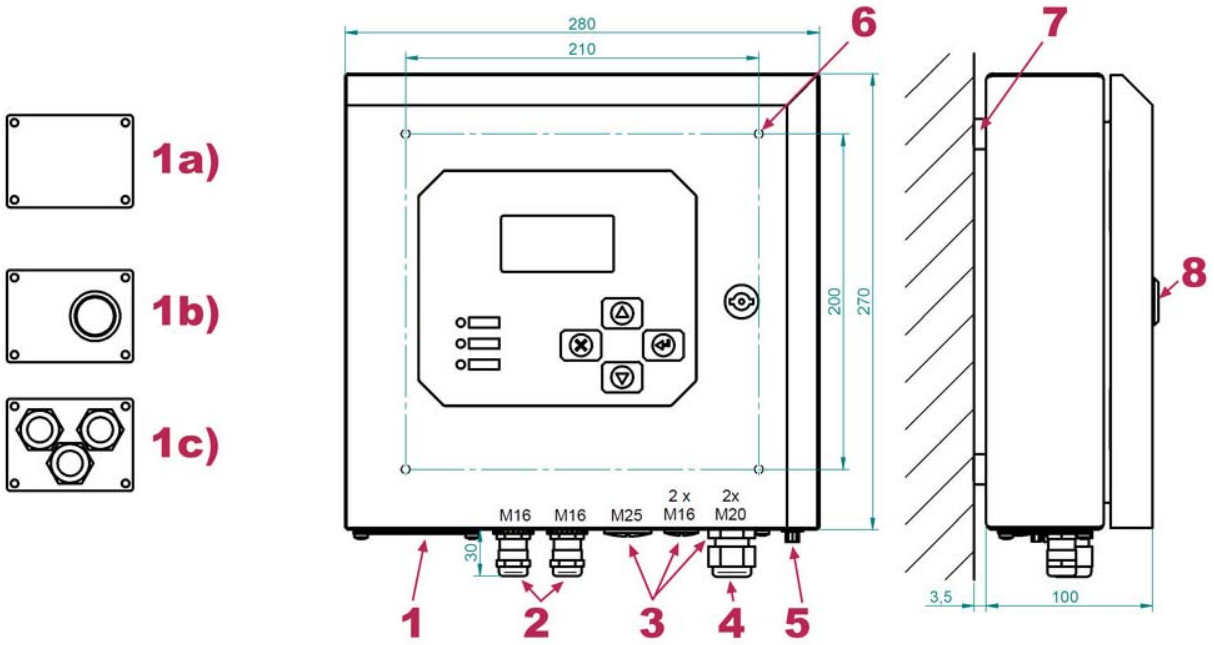
The sliding plate (plastic or wood) must have the correct size or supports, so that it cannot touch the sensor surface, even if the conveyor belt is fully laden (This also counts for the conveyor belt when backing up in the coil). Distance: roughly 10 mm. It is recommended to use wood, to avoid the generation of electrostatic charges.

The proper choice of conveyor belt, suitable for metal detectors, depends on its use. The conveyor belt should have a so-called “finger coupling”. Also, the belt coupling must not be fixed with glues containing metal.

If the construction space of the conveyor belt allows, you may choose a longer metal-free zone.

Electronic housing AMD 05

Spare part drawing number: XXX 0000 033 A-Rev01



1. Adaptor plate
   a) Standard
   b) Option: 1 button
   c) Option: additional cable glands
2. assigned by manufacturer for detector
3. free
4. Mains
5. Sub-D Plug 9-channel (for service purposes only)
6. 4 Mounting bores ∅ 5,2
7. Isolation
8. Double mandrel key 3mm

Opening and closing the electronic cabinet

Before opening the electronic housing, you must stop the conveyor, disconnect the mains plug, check for external voltage at the switch outputs and ensure that the device cannot be switched on again!

See chapter **Introduction → Safety**

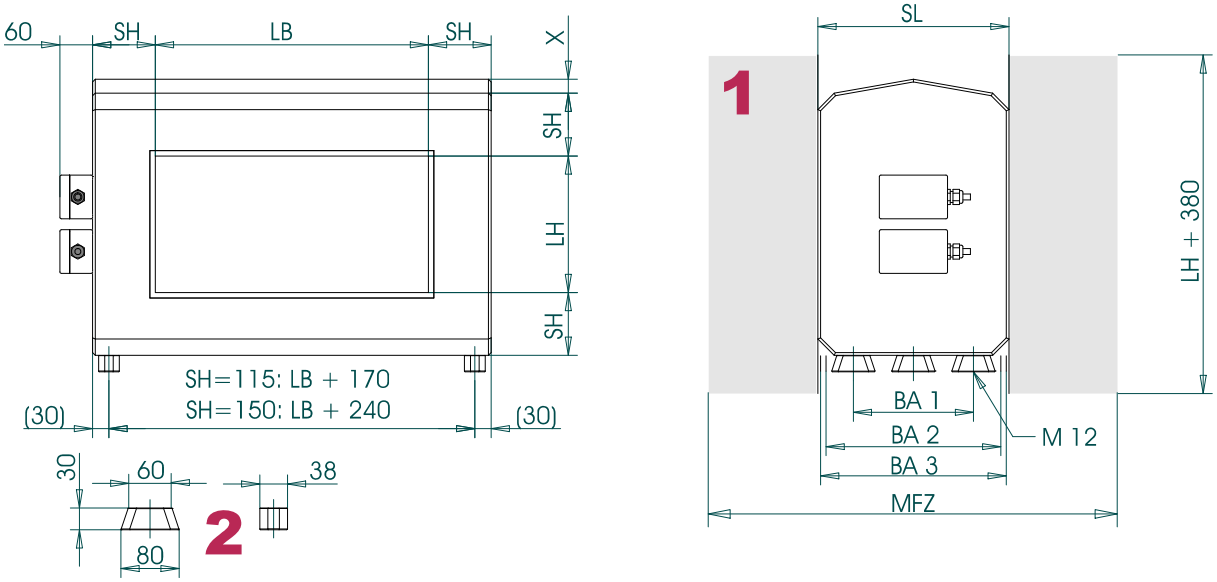
The electronic cabinet can be opened or closed using a two-way key.

1. Open(turn to the left))
2. Close (turn to the right)

Make sure that no cables are trapped when closing the electronic cabine.

Detector C-Coil

Drawing number: C 0500 0000 001 AX



1. Metal-free-zone
   MFZ (non moving metal) = SL + LH [1)]
   MFZ (moving metal) = SL + 3,5 x LH [1)]
2. **Mounting foot**:
   Thread reach: max. = 18 mm
   Thread M12

[1)] The metal detector has to be positioned centrically within the „metal-free-zone“. The calculated values can be used for orientation (minimum values can of course be exceeded!) but must be confirmed by us for the respective project.

LB (Aperture width)

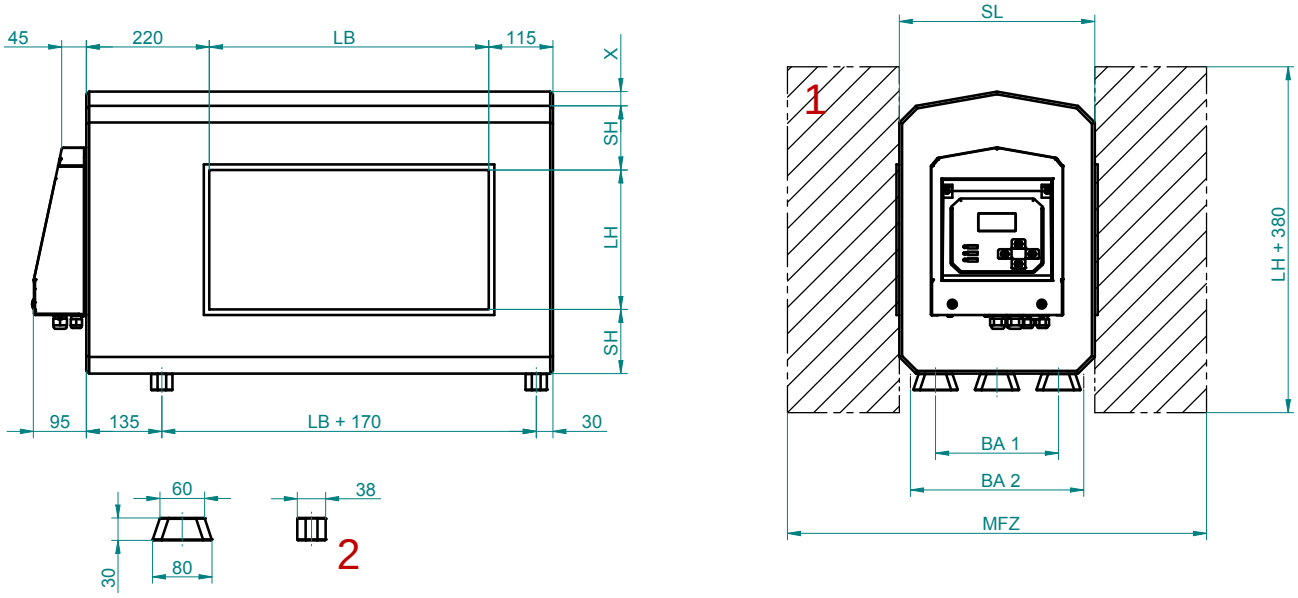
Aperture height **LH**	Detector length **SL**	Top / Bottom thickness **SH**	Distance between threaded bore holes **BA 1**	**BA 2**	**BA 3**	Number of threaded bore holes for each detector **A**	Mounting foot middle	Measure **X**
50 – 150	260	115	130	-	-	4	no	18
175 – 200	300	115	170	-	-	4	yes	22
225 – 250	350	115	220	-	-	6	yes	26
275 – 300	400	115	230	-	-	6	yes	27
325 – 350	450	115	280	-	-	6	yes	31
375 – 400	500	115	110	330	-	8	no	36
425 – 450	550	115	190	380	-	10	yes	40
475 – 500	600	115	215	430	-	10	yes	44
550 – 600	650	115	240	480	-	10	yes	49
650 – 700	700	150	265	530	-	10	yes	-
750 – 800	800	150	150	390	630	12	no	-
850 – 900	900	150	150	440	730	12	no	-
950 – 1000	1000	150	280	560	830	14	yes	-
LH > 1000	1200	150	340	690	1030	14	yes	-

Dimensions in mm

Detector CI-Coil

Dimension drawing CI-Coil without shaft extension

Drawing number: CI 0000 001 A-Rev01



1. Metal-Free-zone
   MFZ (non moving metal) = SL + LH [1)]
   MFZ (moving metal) = SL + 3,5 x LH [1)]
2. **Mounting foot**:
   Thread reach: max. = 18 mm
   Thread M12

[1)] The metal detector has to be positioned centrically within the „metal-free-zone“. The calculated values can be used for orientation (minimum values can of course be exceeded!) but must be confirmed by us for the respective project.

LB (Aperture width)

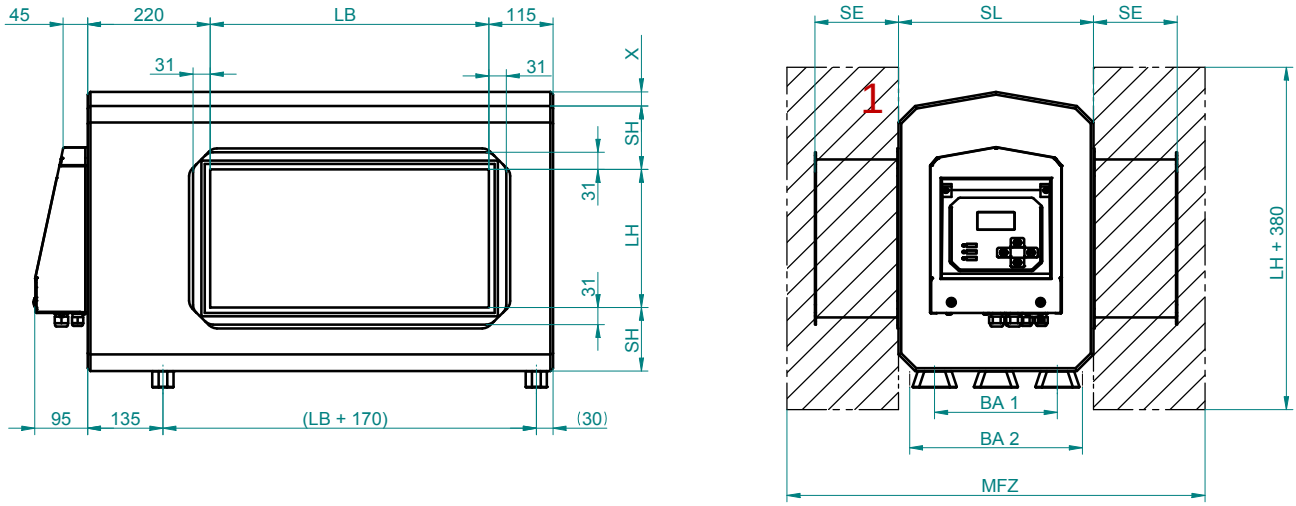
LH Aperture height	**SL** Detector length	**SH** Top / Bottom thickness	**BA 1**	**BA 2** Distance between holes	**A** Number of threaded bore holes for each detector	**X** Measure
50	260	150	130	-	4	18
75	260	130	130	-	4	18
100 - 150	260	115	130	-	4	18
175 - 200	300	115	170	-	4	22
225 - 250	350	115	220	-	6	26
275 - 300	400	115	230	-	6	27
325 - 350	450	115	280	-	6	31
375 - 400	500	115	110	330	8	36
425 - 450	550	115	190	380	10	40
475 - 500	600	115	215	430	10	44
550 - 600	650	115	240	480	10	49

Dimensions in mm.

Dimension drawing CI-Coil with shaft extension (optional)

The shaft extension is used to shield the detector from possible external interference and thus to ensure the functional reliability of the detector.

Drawing number: CI 0000 001 A-Rev01



1. Metal-Free-zone
   MFZ (non moving metal) = SL + 2 x SV + 60mm [1)]
   MFZ (moving metal) = SL + 3,5 x LH [1)]

Detailed specification of the metal-free zone → see quotation drawing "METRON 05 CI"

[1)] The metal detector has to be positioned centrically within the „metal-free-zone". The calculated values can be used for orientation (minimum values can of course be exceeded!) but must be confirmed by us for the respective project.

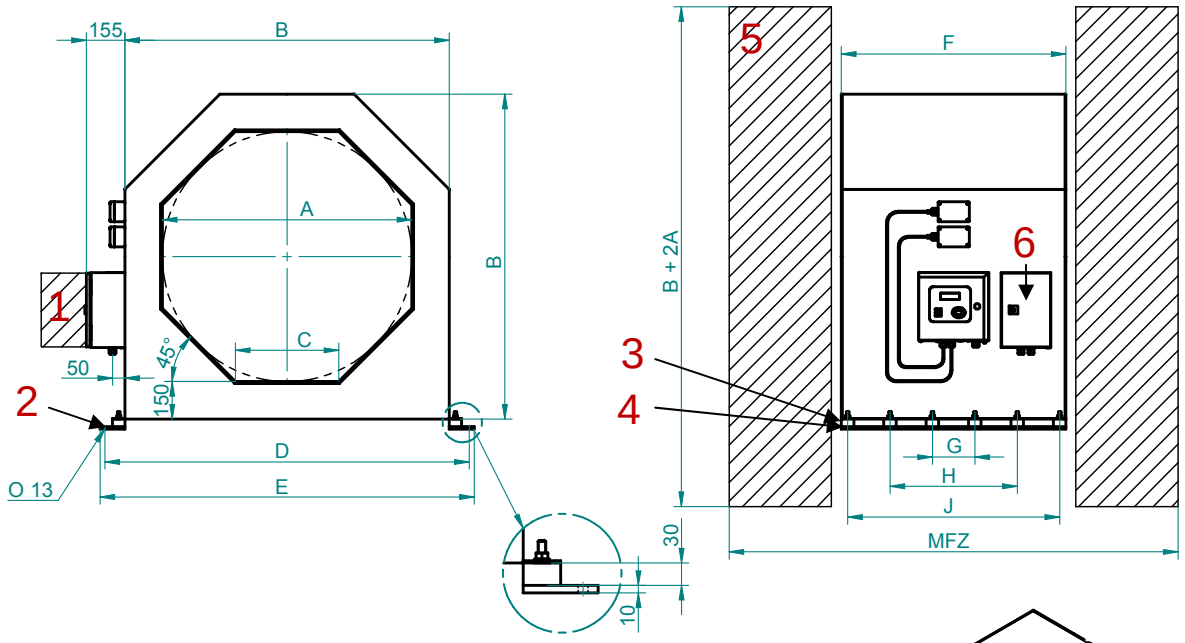
LB (Aperture width)

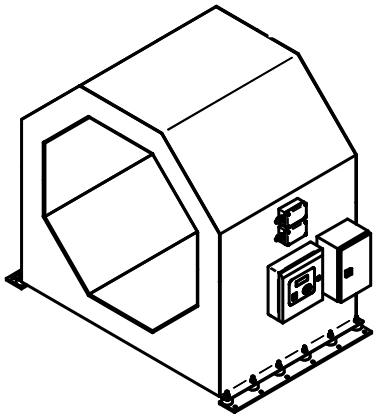
LH Aperture height	**SV** Longer shaft extension
50 - 200	100
225 – 300	150
325 – 600	200

Dimensions in mm.

Detector CO-Coil

Drawing number: CO 0000 001 A-Rev02





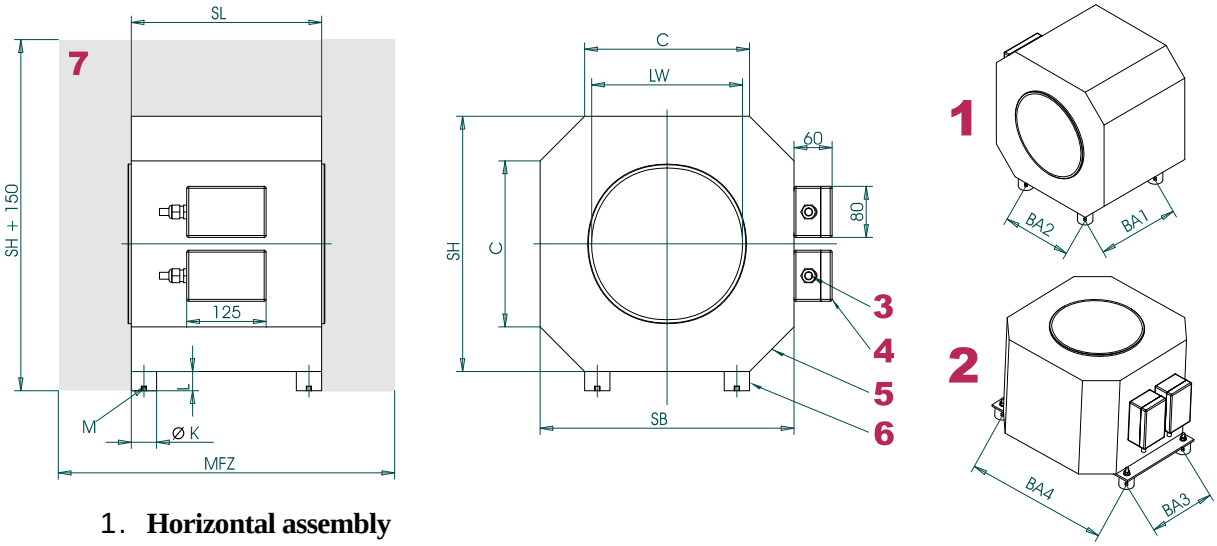
1. Maintenance area 200 mm
2. Fixing holes Ø13
3. Rubber metal M10-8 depth
4. Mounting bar
5. MFZ = Metal free zone (not moving metals)
6. Option: Power supply filter

Type	B	C	D	E	F	G	H	J	MFZ	Weight
900	1200	372	1360	1400	800	150	450	750	2600	ca 290 kg
1000	1300	414	1460	1500	900	170	510	850	2900	ca 340 kg
1100	1400	455	1560	1600	900	170	510	850	3100	ca 375 kg
1200	1500	497	1660	1700	900	170	510	850	3300	ca 410 kg
1300	1600	538	1760	1800	1000	190	570	950	3600	ca 460 kg
1400	1700	580	1860	1900	1000	190	570	950	3800	ca 495 kg
1500	1800	621	1960	2000	1000	190	570	950	4000	ca 530 kg
1600	1900	662	2060	2100	1100	210	630	1050	4300	ca 580 kg

Larger nominal width available on request
All Dimensions in mm.

Detector CR-Coil

Drawing number: CR 0000 0000 003 AA



1. **Horizontal assembly**
2. **Vertical assembly**
3. Access line
4. Access case
5. Detector
6. Rubber metal bumper
7. Metal free zone: MFZ (non-moving metal) = SL + LW [1)]
   MFZ (moving metal) = SL + 3,5 x LW [1)]

The mounting of the coil depends on the application and is located according to each project. After checking all details, individual measurement sheets are available upon request.

[1)] The metal detector has to be positioned centrically within the „metal-free-zone“. The calculated values can be used for orientation (minimum values can of course be exceeded), but must be confirmed by us for the respective project.

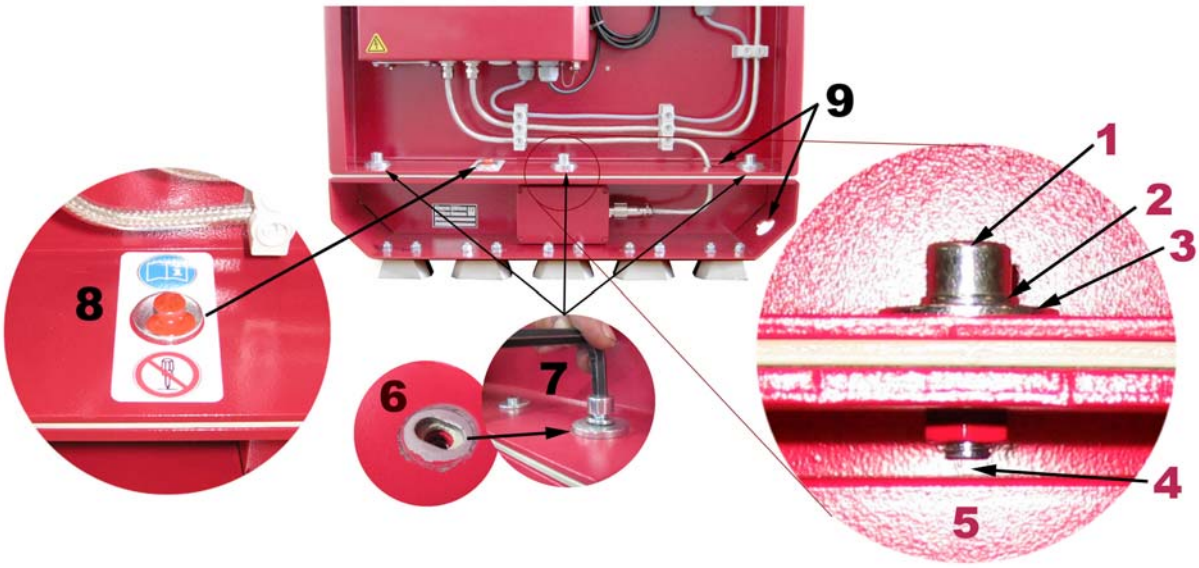
Within extremely restricted assembling conditions, for example an assembly between multiple-head scale and filling and sealing machine, search coils made to specification are available upon request.

Type	LW	SH = SB	C	SL	BA1	BA2	BA3	BA4	L	Ø K	M
CR 35	35	150	90	125	100	65	125	175	15	25	4 x Thread M6 - 7 deep
CR 45	45	150	90	125	100	65	125	175	15	25	4 x Thread M6 - 7 deep
CR 55	55	150	90	125	100	65	125	175	15	25	4 x Thread M6 - 7 deep
CR 70	70	150	90	125	100	65	125	175	15	25	4 x Thread M6 - 7 deep
CR 85	85	200	140	150	125	115	125	225	15	25	4 x Thread M6 - 7 deep
CR 100	100	200	140	150	125	115	125	225	15	25	4 x Thread M6 - 7 deep
CR 115	110	250	150	150	125	125	120	275	15	25	4 x Thread M6 - 7 deep
CR 130	130	250	150	150	125	125	120	275	15	25	4 x Thread M6 - 7 deep
CR 150	150	250	150	200	175	125	120	275	15	25	4 x Thread M6 - 7 deep
CR 170	170	300	200	200	175	175	175	325	15	25	4 x Thread M6 - 7 deep
CR 210 verk.*	210	350	210	200	160	170	170	390	30	40	4 x Thread M8 - 8 deep
CR 235	235	400	260	300	260	220	220	440	30	40	4 x Thread M8 - 8 deep
CR 235 verk.*	235	400	260	250	XXX	XXX	220	440	30	40	4 x Thread M8 - 8 deep
CR 265	265	450	310	300	260	270	270	490	30	40	4 x Thread M8 - 8 deep
CR 265 verk.*	265	450	310	250	XXX	XXX	270	490	30	40	4 x Thread M8 - 8 deep
CR 300	300	500	360	350	310	320	320	540	30	40	4 x Thread M8 - 8 deep
CR 300 verk.*	300	500	360	300	XXX	XXX	320	540	30	40	4 x Thread M8 - 8 deep
CR 335	335	550	410	400	360	370	370	590	30	40	4 x Thread M8 - 8 deep
CR 335 verk.*	335	550	410	350	XXX	XXX	370	590	30	40	4 x Thread M8 - 8 deep
CR 380	380	600	460	450	410	420	XXX	XXX	30	40	4 x Thread M8 - 8 deep
CR 380 verk.*	380	600	460	400	XXX	XXX	420	640	30	40	4 x Thread M8 - 8 deep
CR 430	430	650	500	450	410	460	460	690	30	40	4 x Thread M8 - 8 deep
CR 470	470	700	560	500	460	520	XXX	XXX	30	40	4 x Thread M8 - 8 deep
CR 470 verk.*	470	700	560	450	XXX	XXX	520	740	30	40	4 x Thread M8 - 8 deep

* compact version: for free - fall only Dimensions in mm.

Detector D-Coil (separately coils)

D-Coil Assembly



- **The centring bolts (8) must not be adjusted or removed!**
- **The bolt in the middle (1) must not come into contact with the receiver housing (5), since this can lead to false triggering!**
- **Version with attached circuitry (standard): → only the receiver cable is pluggable**
  Version with separate circuitry: → transmitter and receiver cables are pluggable

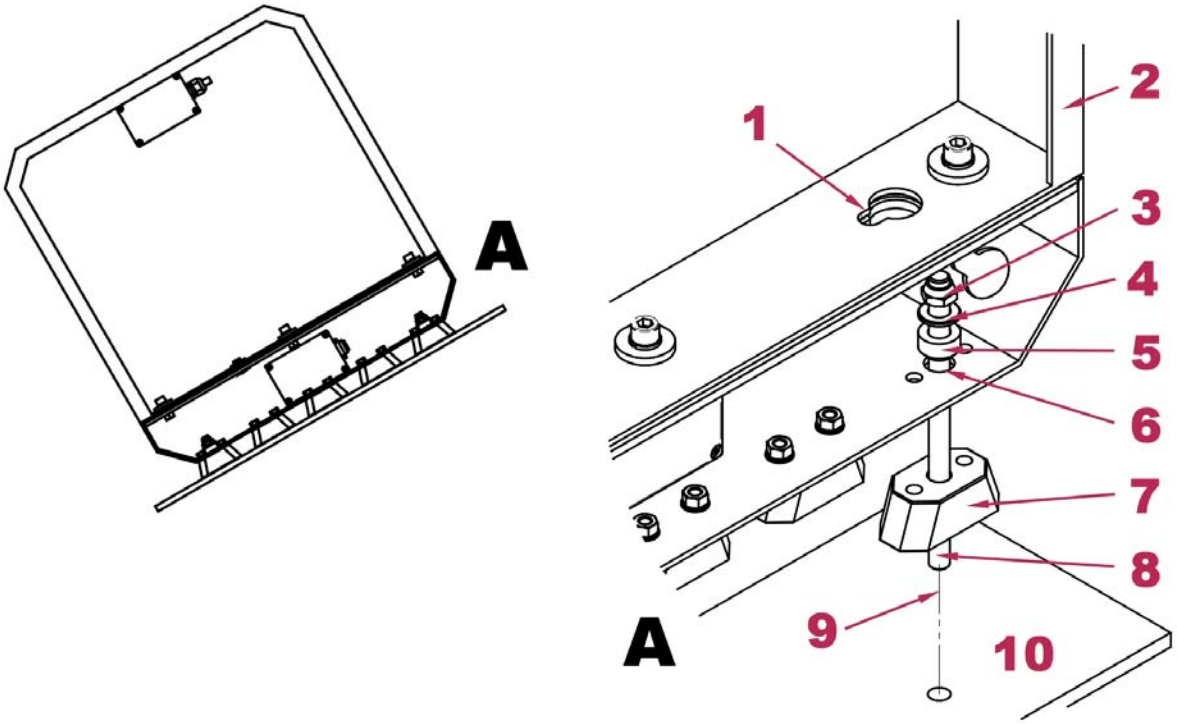
1. Cheese-head bolt DIN 912 – M10x30-vz
2. Spring washer
3. Washer at least 4.5 mm thick
4. Gap to receiver housing
5. Receiver housing
6. Earth connection
7. Tool: 8 mm Allen key
8. The centring bolts must not be adjusted or removed, therefore they are lacquered (on both sides)
9. Cable entry with notch. In the case of 2 or more cables, the rest of the cables can be pushed into the notch in order to feed the plug through

The upper part of the detector is bolted to the lower part of the detector with 3 bolts on each side.

The following items must be observed:

- Remove the plug connector of the receiver cable and, if fitted, also the plug connector of the heating resistor before separating the D coil.
- Ensure that there is a good earth connection (see 6) in the area of the washer. Treat with zinc spray if necessary.
- The bolt in the middle (1) must be bolted together with the spring washer (2) and the corresponding washer (3) in order to maintain the gap (**4**) to the receiver housing (5).

Please observe the following assembly notes for diagonal mounting of D-Coils. (Special version):



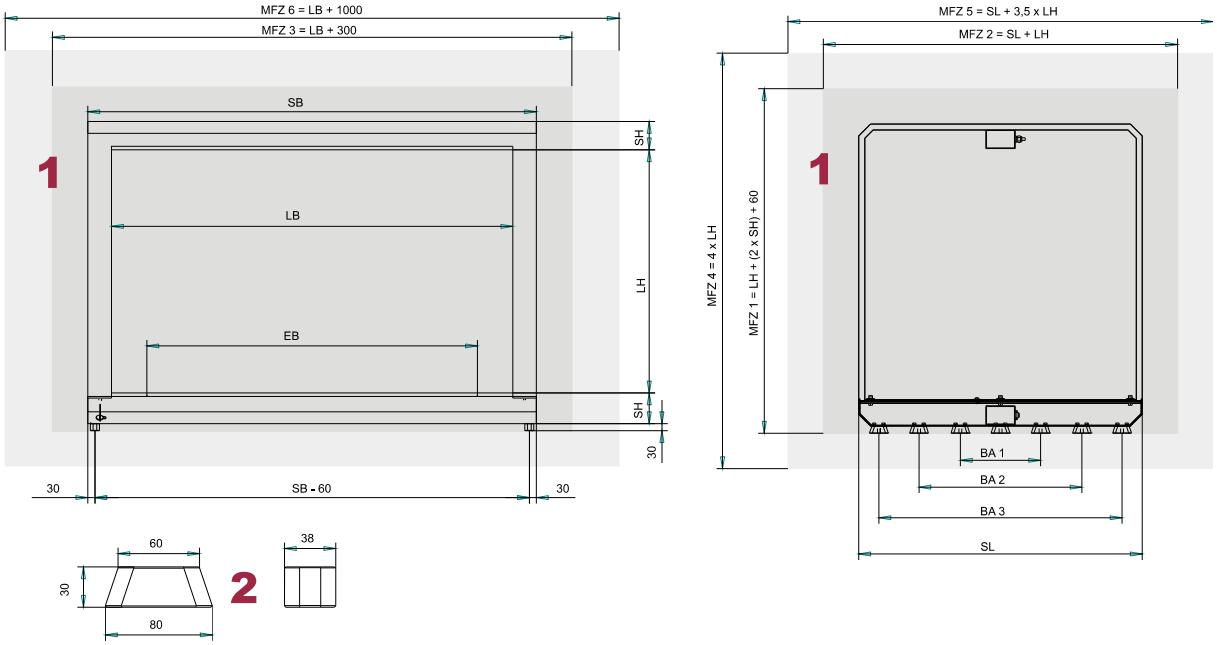
1. Cable entry with notch
2. Metal detector
3. Self-locking nut M12 (art. no. 300 789)
4. Washer DIN 125 (art. no. 300 126)
5. Insulating bush (art. no. 301 092)
6. Hole layout for drilling ⌀17.5, see METRON-D dimensional drawing (fixing holes)
7. Detector foot
8. Threaded rod M12 (l = 200): adapt length when assembling
9. Mounting kit for diagonal installation (quantity 4 pcs per detector)
10. Conveyor belt frame

The metal detector has to be connected (screwed) to the conveyor frame by means of the threaded rod.
However, an insulated mounting has to be guaranteed by the insulating bush:

- The insulating bush must not be damaged during installation
- Threaded rod, washer and screw nut must not touch the metal detector

Dimension drawing of D-Coil

Drawing number: D 0200 0000 001 AA



1. Metal-free zone (MFZ) [1)]
   MFZ for non-moving metals = MFZ 1 / MFZ 2 / MFZ 3
   MFZ for moving metals = MFZ 4 / MFZ 5 / MFZ 6
2. **Mounting foot:**
   Thread reach: max. = 18 mm
   Thread M12

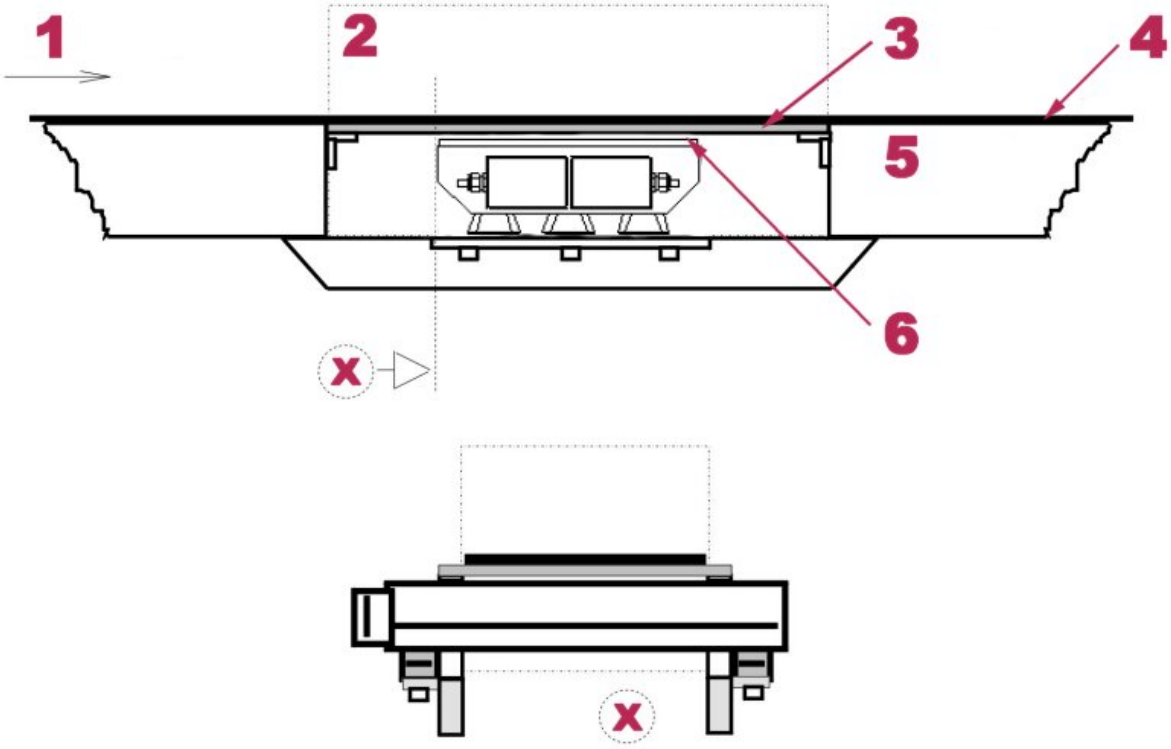
[1)] The metal detector has to be positioned centrically within the „metal-free-zone“. The calculated values can be used for orientation (minimum values can of course be exceeded!) but must be confirmed by us for the respective project.

SB (Coil width) = LB+200 EB (Sensitive area)

Light height	Light width	Top/ Bottom thickness	Coil length		Tap hole distance Mounting foot		Tap hole distance	Mounting foot middle
LH	**LB**	**SH**	**SL**	**BA1**	**BA2**	**BA3**	**A**	
until 200	EB+220	115	400	230	-	-	6	yes
until 300	EB+220	115	500	110	330	-	8	no
until 400	EB+240	115	600	215	430	-	10	yes
until 500	EB+240	115	700	265	530	-	10	yes
until 600	EB+240	115	750	290	580	-	10	yes
until 700	EB+280	115	800	150	390	630	12	no
until 800	EB+280	120	850	150	420	680	12	no
until 900	EB+280	120	900	150	440	730	12	no
until 1000	EB+280	120	1000	280	560	830	14	yes
> 1000	EB+300	120	1200	340	690	1030	14	yes

Dimensions in mm.

Detector S-Coil



1. Conveying direction
2. Metal free zone (MFZ)
3. Bridge plate
4. Conveyor belt
5. Conveyor frame
6. Attentione! Bridge plate may not be in contact with aperture

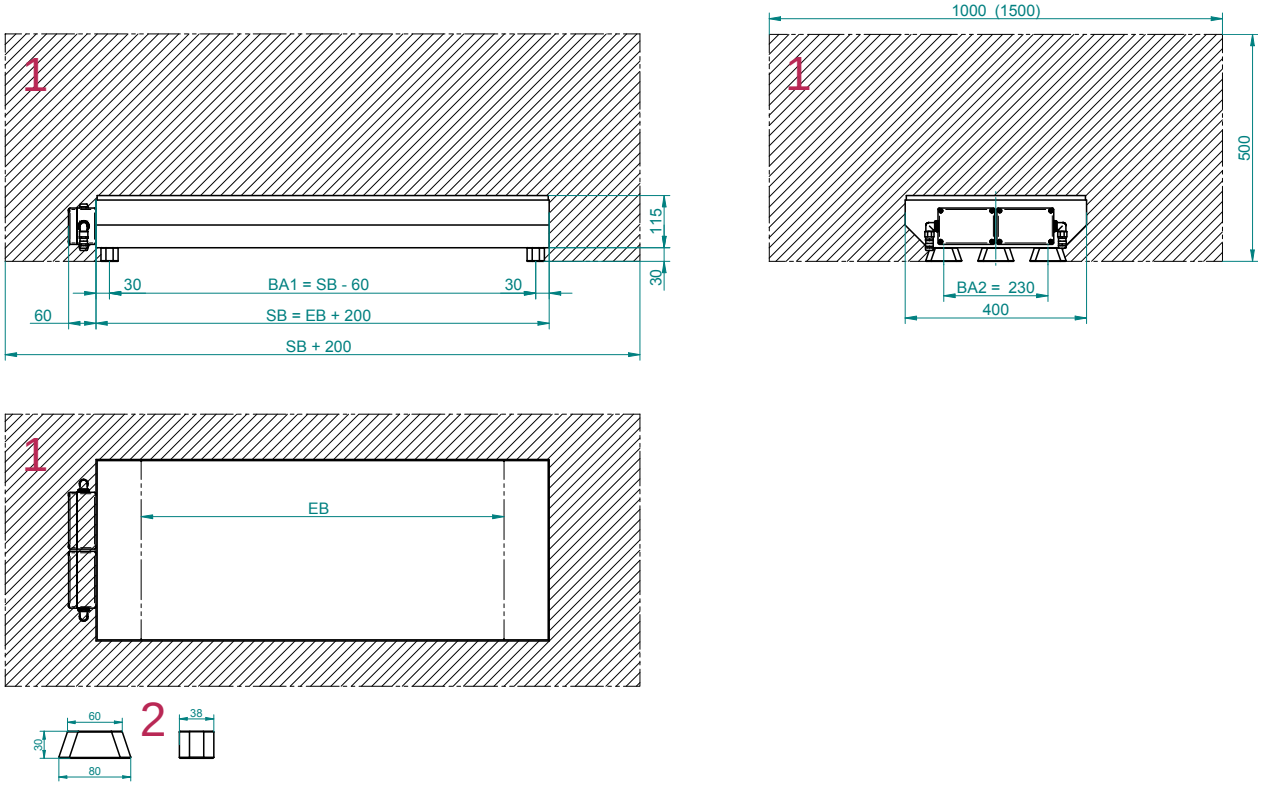
a) View

Mount the type "S" metal detectors as closely as possible to the lower side of the vibro slat or of the conveyor belt.

The closer the product to be analysed is to the sensor surface, the better the sensitivity achieved on the metal parts. HOWEVER: the sensor surface of the metal detector must not be in direct contact.

Dimension drawing of S-Coil

Drawing number: S 0200 0000 001 AB



Dimensions in mm.

1. Metal free zone (MFZ) [1] for non-moving metallic parts
2. **Mounting foot:**
   Thread reach: max. = 18 mm
   Thread: M12

"If used under vibrating troughs, the metal-free zone amounts to 1500 mm".

[1] The metal detector has to be positioned centrically within the „metal-free-zone". The calculated values can be used for orientation (minimum values can of course be exceeded!) but must be confirmed by us for the respective project. The 'metal-free zone' must be extended for moving metal parts and must likewise be confirmed by us in relation to the specific project!

EB	Sensitive width
SB = EB + 200	Detector breadth
BA1 = SB - 60	Distance between threaded bore holes

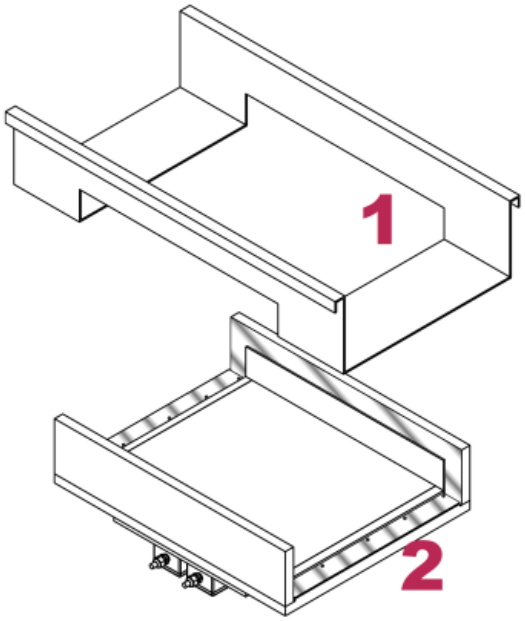
Attention!

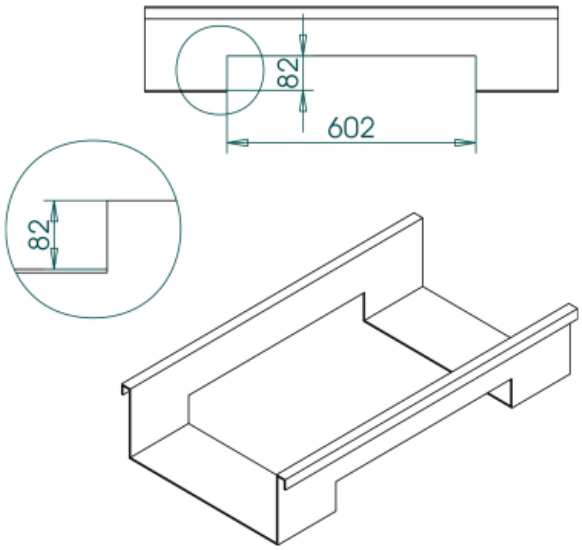
The following applies to chipper protection applications: Minimum distance between metal detector and intake of drum chipper ≥ 3 metre. We kindly request you to consult us if this should not be possible.

Detector VT-Coil

Installation in vibratory trough

Drawing number: VT 0301 0000 011 MX /1,2



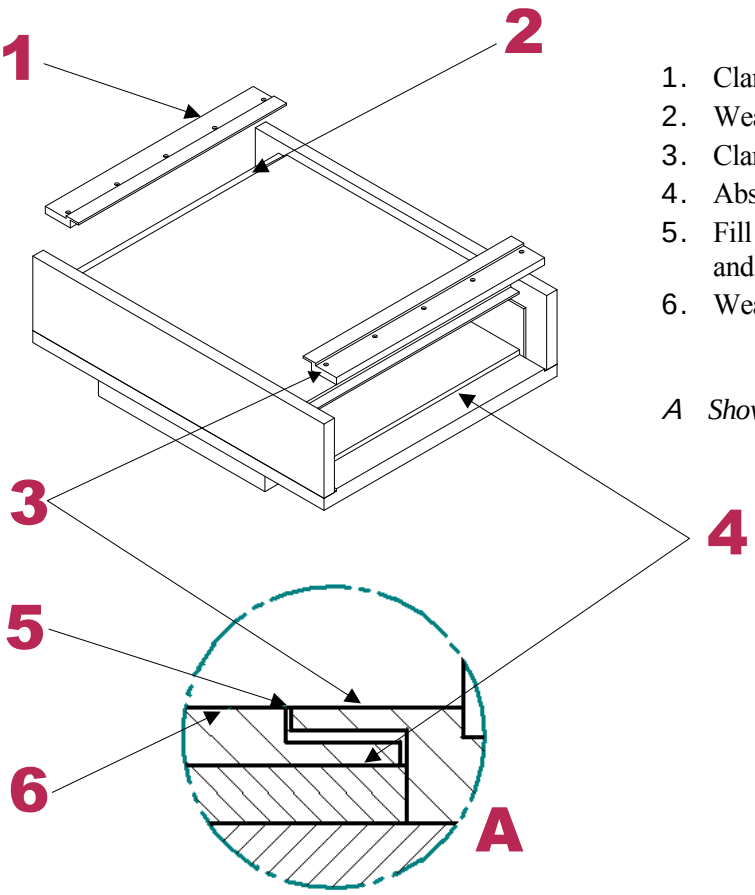


1. The cut-out has to be made according to the following drawing.

2. In the hatched area, (=circumferential milled-out portion) the metal detector **must be** screwed to the vibratory trough.
   The wearing plate is fixated through lateral plastic-strips and screws. When planning your attachment, please observe the position of the screws in the plastic strip. These screws must not be removed.

Exchanging the wearing Plate

Drawing number: VT 0301 0000 011 MX /3



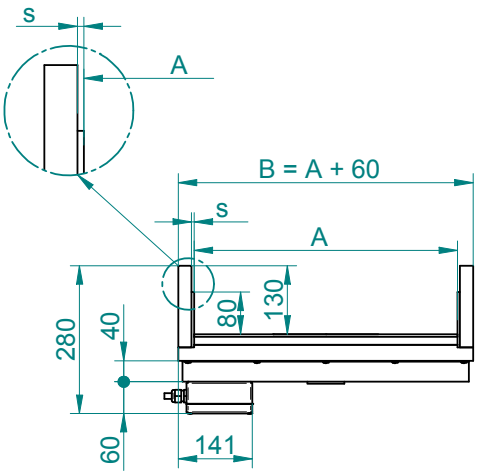
1. Clamping strip
2. Wearing plate
3. Clamping strip
4. Absorption rubber
5. Fill gap with silicon and level the surface
6. Wearing plate

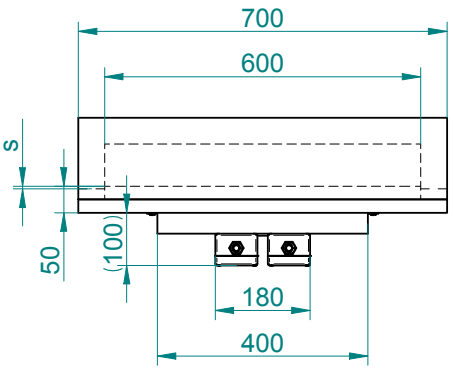
A Shown in the assembled condition

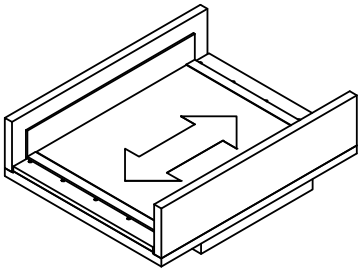
In order to exchange the wearing plate, the metal detector has to be dismounted from the vibratory trough. Remove the screws from the lateral clamping-strips. The lateral clamping-strips, the wearing plate, and, if needed, the absorbing rubber can be pulled of the wood plate on the detector. The new wearing plate and, if necessary, the absorbing rubber are to be positioned analogue to the old ones. We recommend using double-sided sealing tape as a mounting aid.
The gaps between the plastic parts are to be filled with silicon and overhangs on the surface are to be equalised.

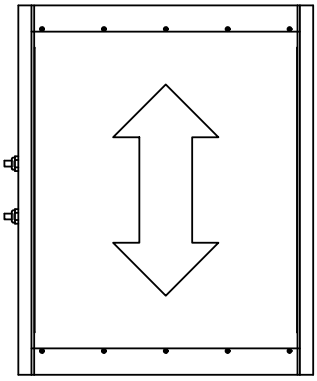
Dimension drawing of VT-Coil

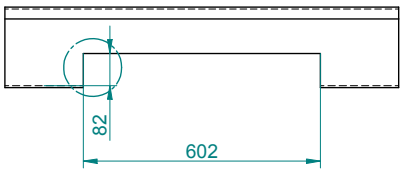
Drawing number: VT 0301 0000 001 AD

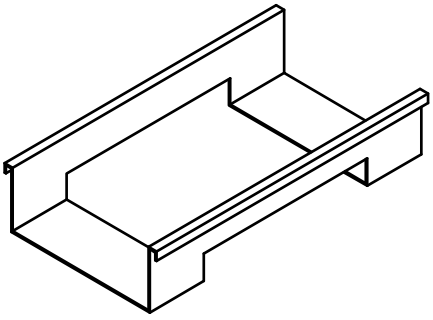


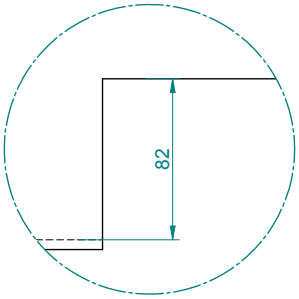












A = Trough width B = Overall width S = Wall thickness

Dimensions in mm.

Connection

Having mounted your metal detector according to the directions provided on the above pages you now can connect it:

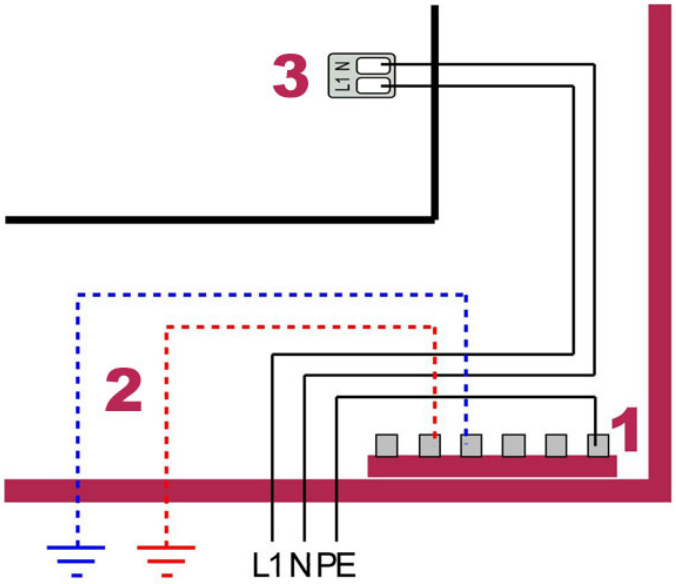
see too chapter **Technology → Plug configuration**

Earth connection

All earthing points must be at the same earth potential! Potential differences are not permissible!

The detector is earthed via the electronic housing. The connection is made via the shielding of the sender/receiver cable. The protective earth cable (PE) must be connected.

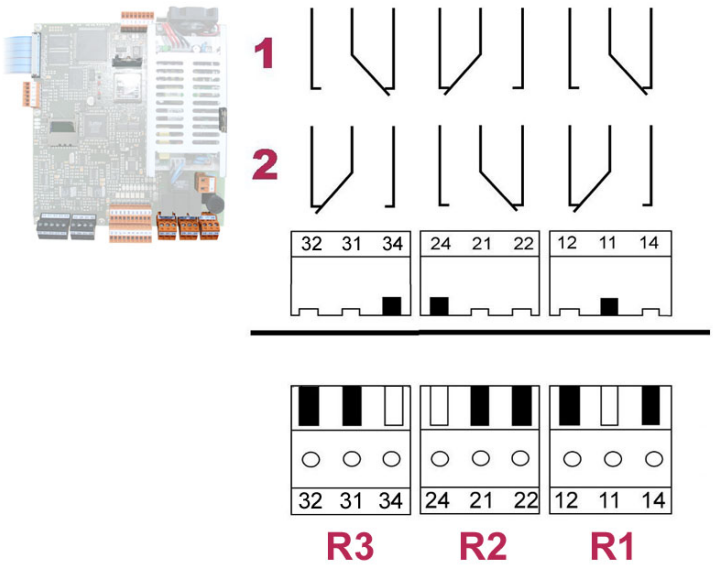
1. Central earth point (connection via 6.3 mm blade terminal)
2. External earth wires should be connected to the central earth point (1).
3. Mains supply



see too chapter **Montage → Connection → Supply voltage**

Relay

Potential-free relay change-over contacts



Relay 1

Factory default (if not agreed upon otherwise) **Relay 1 (R1)** is the metal relay.

Relay 2 (connection recommended)

Additionally to the optical display you can read the operational status via a potential-free contact.

Factory default (if not agreed upon otherwise) is **Relay 2 (R2)** is a stand-by relay.

If the control detect an **„error“** the **„stand-by relay“** switches at once. The switching process of the stand-by-relay you can use for switching a warning system or to interrupt the product flow through the metal detector.

Relais 3

Factory configurable

Factory default:

	After power on	Normal state	On metal	On warnings	On error
Relay 1	OFF (2)	OFF (2)	ON (1)	HOLD	HOLD
Relay 2	OFF (2)	ON (1)	HOLD	OFF (2)	OFF (2)
Relay 3	OFF (2)	OFF (2)	HOLD	ON (1)	HOLD

HOLD: The current switching state of the relay is being held

Supply voltage

Connect the supply voltage only after you have integrated all connections. Otherwise there will be error messages.

The supply voltage has to lie within the following bounds:

100 to 240 V AC
50 / 60 Hz

Power protection: **max. 10 A**

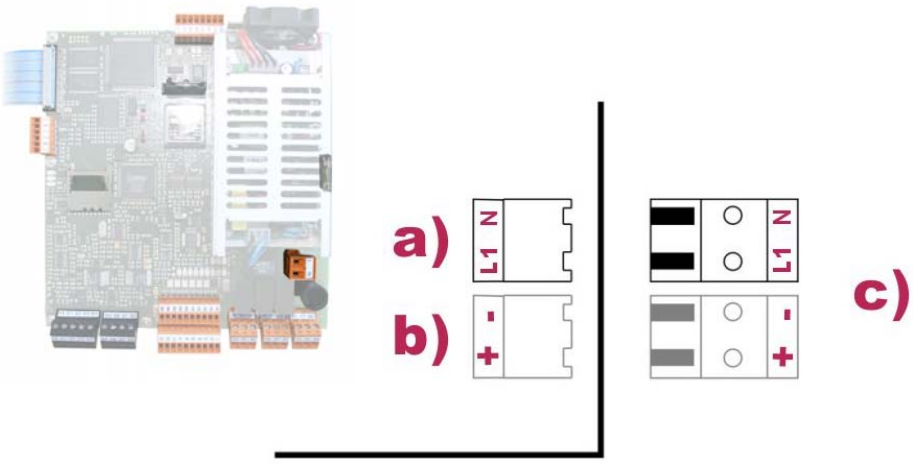
Special version : ***Operating voltage:*** ***20 to 36 V DC***
Power protection: ***max. 2 A***

Please note:

For the mains plug of the customised version, the electronics and, if present, the frame must be included in the earth potential! The metal detector (coil) is to be set up isolated, as usual.

see chapter **Introduction →General notes on metal detection→ Electrostatic discharges**

If you do not use the mains plug of the shipped package, you have to configure the mains connector as follows:



a) Alternate voltage

b) Direct voltage

c) after line filter

see too chapter **Assembly → Connection → General**

- **The electrical safety and installation provisions of the respective country must be observed.**
- **The mains voltage must be separable, i.e. it must be possible at any time to separate the device from the electrical power system.**
- **The applied power connection/mains socket must be in visible near of the device and be well accessible.**
- **Repair and maintenance work on the board may only be carried out by trained and authorized personnel!**
- **Improper adjustments can impair or even prevent your metal detector from operating!**

Operation

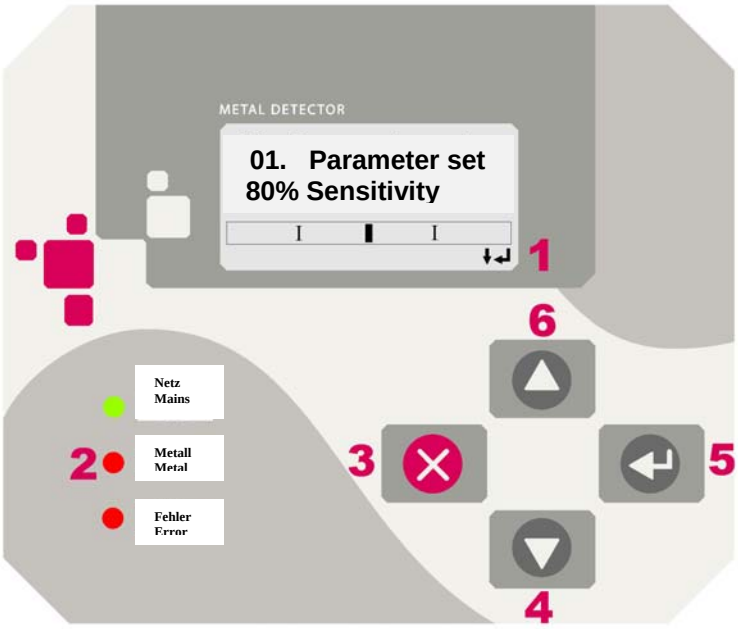
5

General

Your metal detector is operated using the operating unit on the electronics casing. All information necessary for operation are displayed on the screen.

The protective films must be removed from the display following commissioning. This ensures optimum operation.

Operating elements



1. Using the arrow symbols at the edges will provide you with the information, which keys in the current user menu, can be used.
2. The **Mains LED** has to be illuminated while in operation. If it is not illuminated, the device is not connected to the mains supply.

   The **Metal LED** lights up when metal is detected.

   The **Error LED** flashes if the evaluation electronics recognizes a defective state. After removing the cause of the error, some error messages have to be confirmed with „**OK**“. If the error was removed successfully, the LED stops flashing.
3. **„Cancel“**
4. **„Down“**
5. **„OK“ (Direct selection)**
6. **„Up“**

Using the „**Up**“ and „**Down**“ keys you can navigate within the menus and change the settings.

Using the „**Cancel**“ key you leave the current user menu and enter the respective higher menu level.

The „**OK**“-key serves for confirming entered values and for choosing the menu options.

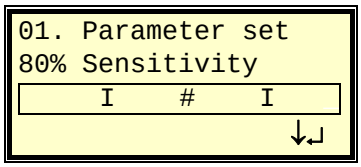
When you are on the main menu level, by using the „**OK**“-key you can directly select options, and „**Down**“ for the **main menu**.

see chapter **Adjustment → Operating level 2 →Access operating level→ Direct access**

For further information regarding the use of the control unit see the following chapter „**Access to operating levels**“.

Access to the operating levels

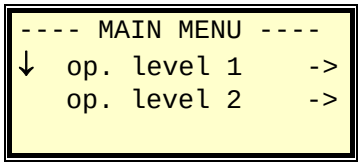
Main operating level



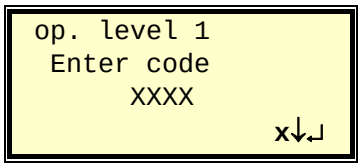
Confirmation by „**OK**“-key will lead you to the direct selection.

see chapter **Adjustment → Operating level QM → Direct selection → Direct access**

Confirming by using the „**Down**“-key leads to the **Main menu**.

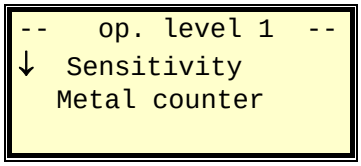


In the main menu you can select the operating level desired with the help of the „**Up**“ and „**Down**“-key and confirm your choice with the „**OK**“-key.

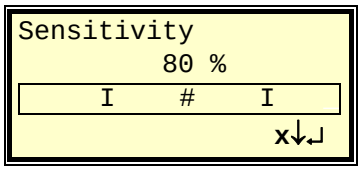


In order to ensure a stable exact detection during operation, the settings at your metal detector can only be changed with right of access.

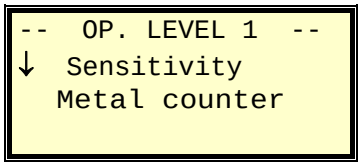
You can find the code number under chapter **Appendix → Access codes**.



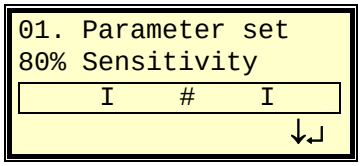
Using the „**Up**“ and “**Down**”-key you can change the individual numbers in sequence. „**OK**“ proceeds to the next digit. Having entered the fourth number and if the code is correct, you will enter the desired operating level. (for instance **Operating level 1** as shown in the left-hand-side example)



Using the „**Up**“ and “**Down**”-key you can select individual menu items and confirm them with the „**OK**“-key. (in this example, for instance, the menu option sensitivity).



If you should not want to adjust settings, you can reach the higher menu by pressing the „**Cancel**“-key. (in this case „**operating level 1**“).



Once more pressing „**Cancel**“ in the left-hand-side case would bring you back to the main operating level.

Adjustment

6

General

The metal detector is factory-preset. Normally there should be no or only minor changes required.

Note that adjusting the settings in an improper way can impair or prevent your metal detector from functioning.

On the following page, you will find an overview of all menu items. Depending on the application, some menu items may be de-activated and will therefore not be visible on the display. These menu items are marked as "**(optional)**".

Changes may only be carried out by trained and authorized personnel.

Overview operating levels

Operating level 1

Sensitivity
Choose parameter set (Change products)
Charge number **(optional)**
Test diverter **(optional)**
Empty out collector bin **(optional)**
Metal counter
Start detector test

Operating level 2

Learn Product
- Learn product manual
- Learn product automatic
- Learning optimisation
- Learning sensitivity
- Number of learning angles

Reject parameter
- Reset mode
- Reject delay
- Reject time (optional)
- Cumulative ejection time (optional)

Metal counter
Parameter set
- Choose parameter set (Change products)
- Change name
- Copy parameters
- Create new
- Delete

Conveyor speed
Measure noise
Frequency
- Secondary frequency
- Select transmitter frequency (optional)

Clock setup
Operating language
- Change language
- Copy language
- Change name

Detection
- Detection (optional)
- Active output A1
- Offline transmitter level

Card reader (optional)
- Adjust cards
- Display reset data
- Print reset data

System info
- Version info
- Measured values

Restore factory settings

SD-card
- Software update
- FPGA-Code update
- Print SD
- Setup parameters
- Product parameters

Operating level QM (Quality management)

Detector test
- After power on
- Test cycle
- Test timeout
- Signal tolerance
- Angle tolerance
- Learn sample part
- In the event of a test fault

Contamin. Level
- Measure interval
- Detections

Print log
- Print mode (optional)
- Print log (optional)

Access operating level
- Direct access
- Access operating level 1
  - *Code operating 1*
  - *Access code*
- Access operating level 2
  - *Access code*
- Access operating level QM
  - *Access code*
- Code input - reset
  - *Code number - reset*
- Code input - test
  - *Code number - test*

Charge number

Conveyor belt test
- Starting the belt test
- Settings
  - *Contamination threshold*
  - *Basic sensitivity*
  - *Limit value tolerance*

Container full message

Operating level 1

Sensitivity

The metal detector is set to optimal sensitivity by factory default (unless a different setting has been agreed upon previously). The factory default settings are the best possible compromise between maximally attainable detection precision and the lowest possible sensitivity to interference. Data sheet sensitivities are attained with sensitivity settings between 90 – 100%. When setting up the machine, please make sure you use a metal part (e.g. a test object), which you will have the machine detect. Later, during operation, metal parts of the same size and larger metal parts are ejected – not smaller ones. In case you do not have appropriate metal parts, you can obtain standard-sized test objects on test rods.

Attention:
The higher the sensitivity, the higher the susceptibility to erroneous ejections.

To optimise the sensitivity setting, you should use the following pattern:

1) Take the smallest metal piece you want to detect and run it through the metal detector (standard test pieces can be abstained from the manufacturer)

2a) Metal detection

Reduce the sensitivity in small steps until the smallest metal piece is no longer detected, and increase the sensitivity setting by a safety reserve of 5 %.

2b) No metal detection

Increase the sensitivity in small steps until the smallest metal part is finally detected, and increases the sensitivity setting by a safety reserve of 5 %.

Please note:
The display of the sensitivity setting in percent does not indicate the absolute sensitivity of the machine. Rather, the sensitivity setting within a defined range is defined here. This means that even at the minimal setting of 1% sensitivity, the machine will still exhibit basic sensitivity.

Please observe the following for metal detectors with test aperture:
The metal sensitivity in the test aperture may vary from the stated metal sensitivity of the detector. The test aperture is designed only to verify the functions of the detector, it is not designed to indicate the kind or size of metallic contaminant which can be detected.

see chapter **Adjustment → Operating level QM → Detector test**

Choose parameter set (Change products)

You can choose between all parameter sets stored under parameter memory.

see chapter **Adjustment → Operating level 2 → Parameter set**

Charge number (optional)

The menu item **charge number** is only displayed if it has been activated.

Here a new charge number can be entered. Via the charge number, different customer orders, e.g., are recorded separately from each other in the printer protocol.

see chapter **Adjustment → Operating level QM → Printing → Protocol print-out**

Test diverter (optional)

The menu item **Test diverter** is only integrated in machines with separating mechanics.

Switch the menu item **Test separator** to **"ON"**, in order to start a test separation of the separator unit.

After the test separation has been carried out, the **Note 26** is displayed for ca. 15 seconds. The note informs you about the reaction time measured when switching the separating mechanics on and off.

Attention:

- A function test of the separating mechanism must be carried out once per day
- If the machine is in error mode, the function **Test diverter** is locked for security reasons.

Empty out collector bin (optional)

The **Empty out collector bin** menu item is only displayed, if **Cumulative ejection time** has been activated in operating level 2.

If you wish to empty out collector bin before it is full, this menu item will re-set **Cumulative ejection time**.

see chapter **Adjustment → Operating level 2 → Reject parameter → Cumulative ejection time**

Metal counter

The menu item **metal counter** shows the number of metal messages issued by your metal detection device.

On operating level 2 the metal counter can be restored to zero.

choose **Operating level 2 → Metal counter**

Start detector test

You can start the detector test manually here. You can set the time duration (test timeout) in which you must perform the detector test and additional configurations in the **detector test** menu item.

see chapter **Adjustment →Operating level QM→ Detector test**

Operating level 2

Learn product

The learning process is necessary if when **metal-free** products are transported, the message **„metal“** occurs. This process is also called product compensation i.e. the metal detection device is set in a way that the influence of the product is suppressed.

Note:
During the learning process only metal-free products may be transported!

The learning procedure can either be carried out automatically (recommended) or manually.

Learn product manual

The learning angle is he value with which the compensation is being carried out at this point.
The optimum learning value is achieved when the measurement signal in the display is as smooth as possible. If the trigger limit is still being exceeded even with optimum learning values, the sensitivity must be reduced.
The value set here refers only to the properties of the product material and **not** the product quantity.

Learn product automatic

After starting the machine, the automatic learning procedure will be executed by means of two product passages.

During the test runs, please **only** convey metal-free products.

The number of product passages may increase depending on the product as well as the product`s condition.
After successful "learning" the learning procedure will be finished automatically.
If the automatic learning procedure was not stopped successfully, you should learn the product manually and reduce sensitivity, if needed.

<u>These settings are automatically accounted for during automatic product learning:</u>

Learning optimisation

Off: If trigger limits are still exceeded with the current learning value, the sensitivity should be decreased.

Automatic: In the case of automatic optimisation, the product is optimised for the sensitivity which is currently set.

Learning sensitivity

Sensitivity during the learning process.

Number of learning angles

This specifies how many products must have the same learning angle during the learning process. The automatic learning process ends only after that.
Default value: 2

Reject parameter

Reset mode

Depending on you application, you can reset a metal detection either **automatically** or **manually.** If no particular requests have been given by the customer, the metal detectors will be supplied with reset mode „**automatic**“.

- **Reset mode automatic:**

Time-controlled metal notification is set for automatic ejection of metal-contaminated products. You may set the delay and duration of the metal notification in the menu “**Operating level 2 → Reject parameter**”

- **Reset mode manual:**

With this reset mode, you can only delay the metal signal, e.g. to remove the metal part from the opening. The machine is restarted by resetting the metal detector at the display or with an external **reset button.**

Reject delay

The set value is a time shift between metal part detection in the seeker coil and the signals at the exits. The metal delay can be set independently of the reset mode.

see chapter **Adjustment → Operating level 2 → Separating parameter → Reset mode**

The reject delay can be chosen from 0 (off) to 30 seconds. Depending on the application the reject delay can also be indicated in [mm] by the software.

Reject time (optional)

Reject time is the time, within which the rejection mechanism remains in the scrap rejection position once metal has been detected.

The Reject time can be chosen from 0.1 to 10 seconds.

You can find the optimal setting, by starting with an absolutely safe ejection time, and reducing the value step by step. The first time that the metal part is not rejected, you increase the value, adding a further safety leeway.

Cumulative ejection time (optional)

The **Cumulative ejection time** menu item is only displayed if **Reset mode automatic** has been selected.

The menu item **Cumulative ejection time** is used to monitor the collector bin and prevent it from flowing over. The Cumulative reject time is calculated as follows:

Reject time x Number of metal events = Cumulative ejection time

An example:

The Reject time is set to 1 second.

see chapter **Adjustment → Operating level 2 → Separating parameter → Reject time**

After 20 metal events, the collector bin is full.

1 s (Reject time) **x 20** (Number of metal events) **= 20 s** (Cumulative ejection time)

To ensure that your machine runs smoothly, you have to set **Cumulative ejection time** to 20 seconds. After 20 metal events, a notification is displayed, telling you that the collector bin is full. By confirming the notification, the Cumulative ejection time is automatically reset. **Cumulative ejection time** can be set to values between 0 (OFF) and 180 seconds.

Metal counter

With **"Up"**, you can set **delete metal counter** to "**ON"**. Confirming the dialog box with **"OK"** re-sets the metal counter back to zero.

see chapter **Adjustment → Operating level 1 → Metal counter**

Parameter set

The **name**, **sensitivity**, **ejection time**, **ejection delay**, **learning angle** and **frequency** for a particular product are linked together to form a **parameter set**. Changing the parameter set therefore also results in a change of the sensitivity, ejection time, ejection delay, learning angle and frequency.

Change parameter (Change products)

You can select parameter sets on the left.

Change name

You can change individual parts of the name. You can choose from all characters (small and capital letters) and all numbers.

Copy parameters

Under **Copy parameters** you can copy the values linked with the parameter set from one parameter set to another.

Create new

Adds a new parameter set on the basis of the currently selected parameter set

Delete

Deletes the parameter set selected on the left.

Conveyor speed

By means of exact matching to the maximum conveyor speed, external high-frequency influences on the measurement signal can be eliminated. The set value is dependent on the actual conveyor speed of the unit. Set the maximum conveyor speed of your conveyor system as the set value.

By adjusting the minimum conveyor speed, low frequency influences on the measurement signal can be cancelled out. The set value should only be changed if the actual conveyor speed is lower than the preset value.

Please note:

If the maximum conveyor speed is set lower than the actual speed, sensitivity losses will occur. If you do not know the exact speed of your conveyor system, it is preferable to set the maximum conveyor speed higher than the actual speed. In no case should it be set lower.
If the minimum conveyor speed is set higher than the actual speed, sensitivity losses will occur. If you do not know the exact speed of your conveyor system, it is preferable to set the minimum conveyor speed lower than the actual speed. In no case should it be set higher.

Measure noise

While measuring the noise faults that concern the seeker coil are measured. **Measuring the noise** will take ca. 5 seconds and is measured in [mV].

The **background noise** comes to **50 mV.**

Frequency

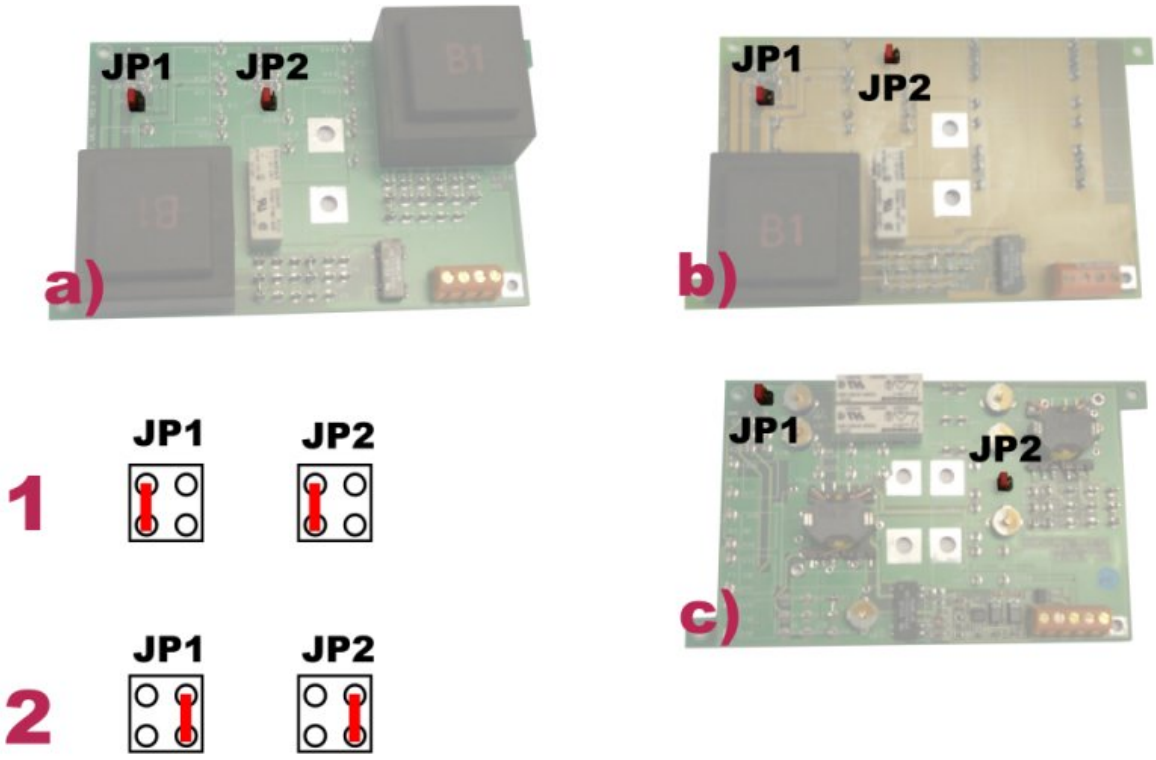
Secondary frequency

If the metal detector is exposed to strong interference in the factory-pre-set main frequency, and normal operation is impossible, you can change to a secondary frequency.

```
OFF = Main frequency
ON  = Secondary frequency
```

Multi-mode machine:

If you use the secondary frequency setting in combination with a **Multi-mode** machine, you have to check that jumpers **JP1** and **JP2** of the transmitter and receiver boards of the coil are configured properly:



a) Transmitter board type 1
b) Transmitter board type 2
c) Receiver board

1. Main frequency
2. Secondary frequency

JP1 = Jumper 1
JP2 = Jumper 2

Please note:

- The transmitter and receiver boards are in the transmitter and receiver connector housings of the seeker coil.
- The transmitter board can be either type 1 or type 2.
- If you activate the secondary frequency, it is automatically activated for both main frequencies.

Changes may only be made by trained and authorised staff.

Select transmitter frequency (optional)

The menu item **select transmitter frequency** is only available for **Multi-mode** machines.

You can choose between two factory-pre-et frequencies, **high** and **low**.

Attention:
If the product exhibits a high product effect, or when conveying packaging containing aluminium, you should select a low frequency as a general rule. Analogous to this, you should select a high frequency if the product effect is low.

Please note, that the transmitter frequency is connected to the product (parameters).

Difference between selecting transmitter frequency – secondary frequency:
Using the optional transmitter frequency selector for multi mode machines, you can, depending on product characteristics, choose between the factory pre-set frequencies **high** and **low** (e.g. 62.5 kHz and 500 kHz). The secondary frequency selector only allows the machine to switch to a secondary frequency (e.g. 63.5 kHz for 62.5 kHz main frequency). If you operate more than one metal detector in the same production environment, you should indicate this when ordering. The different main and secondary frequencies of the metal detectors can then be adjusted optimally to each other in the factory. Please note the indications for setting the secondary frequency with multi mode machines.

see chapter **Adjustment → Operating level 2 → Frequency→ Secondary frequency**

Clock setup

You can set the **date** and **clock.** After confirming the seconds setting the **clock** starts running.

Operating language

Change language

At the left, select the language you would like for the text output on the display and confirm with **OK**.

Caution:
If you answer the prompt "**Set user defined strings to default values**" with "**yes**", all the parameter set (product) names you entered previously will be deleted. If you answer "**no**", the names stored under parameter memory will be imported into the newly entered language.

see chapter **Adjustment → Operating level 2 → Parameter set**

Copying a language

You can load up to three additional languages to the circuitry from an SD card. To do this, first select the language to be copied on the right, then the target position for the new language on the left. The languages "German" and "English" cannot be overwritten.

The SD card reader can be found in the chapter **Technology → Layout plan → Circuitry**

Change name

You can change the name of the selected language under the menu item "Change name". The complete alphabet (capital and small letters) and numbers are available for use as characters.

Detection

Detection (optional)

Menu feature **Detection** is only visible if this option is not available in the terminal block.

Under this menu item, you can activate or de-activate the metal search and ejection mechanism of the detector. Also, all switching exits and relays used for metal detection are deactivated, and the receiver voltage monitoring device (EMP_HIGH) is suppressed.

Active output A1

In addition, you may set the position of the ejection unit under **Switching exit A1**, provided the unit is connected via the **24V switching exit: metal** (A1).

see chapter **Technology → Plug configuration → Terminal block**

Offline transmitter level

ON: If **detection** is set to OFF, the transmitter voltage is retained and is not down-regulated.

OFF: If **detection** is set to OFF, the transmitter voltage is also down-regulated.

Card reader (optional)

The card reader menu item is only shown if you operate the machine with the optional card reader

Card setup

Under the menu item **card setup** you can newly configure the cards (**Key Cards**) included in the delivery, or configure new cards.
To do this, select the card number you wish to change. Then insert the card you wish to modify into the card reader and confirm. The card in the reader has now been assigned the card number.

Show reset data

Under the menu item show **reset data** you can view the last 20 entries.

Print reset data

Under the menu item **print reset data** you can print the reset data. This is only available if the printer is active.

To do this, set **print reset data** to **YES** and confirm.

System info

Version info

Under **version info** you get displayed the **software version,** the **serial numbers** of the corresponding device components of your metal detection unit and further important data. The display remains in the text display each time for approximately 5 seconds.

Please take down the version information for possible service inquiries:

Software version:	.....	Version FPGA:	.....
Controller type:	.....	ACK - number:	.....
Flash:	.....	Serial no. electronics::	.....
Display:	.....	Serial no. coil:	.....
Function block::	.....	Serial no. mechanics:	.....

Measured values

Under the menu item **Measured values** you can call up internal parameters from the metal detection circuitry. These measured values are intended for service and diagnosis purposes.

Measured value designation	**Measured value**	**Meaning**
RX volt. AMP	0.000V	Receiver voltage at the AD converter amplitude branch
RX volt. PHA	0.000V	Receiver voltage at the AD converter phase branch
TX voltage _A	12.8V	Transmitter voltage A
TX check_A	0.51V	Transmitter load A
signal	0.00/0.00	Signal amplitude 1st half-wave / 2nd half-wave
sig. Angle	110.83°	Signal angle
pl. Angle	90.00°	Compensation/learning angle
thresh.	0.186	Trigger threshold
noise	24mV	Set interference level
+24V	24.00V	Supply voltage 24 VD
+15V	15.00V	Supply voltage + 15 V
-15V	-15.00V	Supply voltage - 15 V
+5V	5.00V	Supply voltage + 5 VA
+3.3V	3.3V	Supply voltage 3.3 V
Temp	30 C°	Temperatur C°
Emp low		Vs

Restore factory setting

With **Restore factory setting** you can restore the default factory parameters.

SD-Card

Only multimedia cards (MMC) can be used with software versions before AMD05-2.2.00. From software version AMD05-2.2.00 upward both multimedia cards (MMC) and SD-Cards may be used.

Software update

The current software is replaced by a new version. To do this, select the new software version on the left and press **'Update'**. After a few minutes the device will start with the new software.

FPGA-Codeupdate

Following a software update it may be necessary in some cases to also update the code for the FPGA function block. In this case message 58 'Please update FPGA code to version Lattice …' appears. The FPGA code can be installed from the SD card via **'Update'**. The latest FPGA code can be requested from the manufacturer.

Print SD-Card

Analogously to the menu item **Print**, all events and errors will be saved here in TXT format on your MMC card.

For further information see chapter **Settings → Operating level QM → Print**

Setupparameter

Load from Board
The setup parameters are loaded from the circuit board to the SD-Card.

Write to Board
The setup parameters, which are saved in a file (*.spf), are loaded from the SD-Card to the circuit board.

Productparameter

Load from Board
The product parameters from the circuit board are loaded to the SD-Card.

Write to Board
The product parameters, which are saved in a file (*.ppf), are loaded from the SD-Card to the circuit board.

Operating level QM

Detector test

There are several options regarding when the detector test is to take place. It is possible to carry out the detector test after each system start-up and / or after the expiration of a defined time interval during production.

Process of the detector test:

The process of the detector test after switching on is identical to the detector test during production.

The warning **„Please start detector test“** must be confirmed with **„OK“** to start the test duration. Feed one reference standard through the detector during the test period. (You can order standardised reference norms from the manufacturer.) If a metal signal is triggered, the detector is operating correctly.

If no metal signal is detected during this testing phase, or if the metal signal is outside the signal or angle tolerance range, the error message “**Detector test failed**” is displayed. Start the detector test manually to carry out additional tests.

see chapter **Adjustment → Operating level 1 → Start detector test**

Please contact our service department if your metal detector does not detect the metal several times in a row.

see **Errors and Problems → Service**

After power on

You can now adjust if and when you want to perform a detector test after system start-up.

max.:	10 min. after power on
Factory setting:	OFF (0 min.)

Test cycle

Enter the time interval, when, after expiring, the detector test is to be repeated.

max. test cycle:	24 hrs.
Factory setting:	OFF (0 min.)

Test timeout

In the following mask, you can set the test duration within which the detector test must be carried out.

max. test duration:	60 min.
Factory setting:	10 min.

Signal tolerance

If signal tolerance is active, the generated metal signal is compared with a reference value, that has been saved under menu item "**Learn sample parts"**. The selected value shows the maximum permissible deviation of the detector-generated metal signal from the learned nominal value.

see chapter **Adjustment → Operating level QM → Detector test → Learn sample parts**

Signal tolerance:	OFF (0%) to 50%
Factory setting:	OFF

Angle tolerance

Analogous to **Signal tolerance**

see chapter **Adjustment → Operating level QM → Detector test → Signal tolerance**

Angle tolerance:	OFF (0°) to 50°
Factory setting:	OFF

Learn sample parts (optional)

Upon activation of the mask, the machine waits for a sample part to be introduced into the detector. Once metal has been detected, the values for the sample part are displayed and saved with **"OK"**, so that they are available for comparison with the results of the automatic test when **Signal tolerance** and **Angle tolerance** are active.

On test failure

Message „Detector test failure" to be displayed as error or warning.

Contamin. level

Here, you can make adjustments for monitoring the contamination level of the product flow. The degree of contamination is defined by the **number of detections** per **measurement interval**.
If the preset criteria have been reached in the system, warning message no. 38 is issued.

see chapter **Errors and problems → Error messages and hints**

Measure intervall

The adjustment in minutes and seconds is executed separately.

Max. measurement interval:	30 min.
Factory setting:	OFF (0 min.)

Detections

The number of detections in the previously set measurement interval.

Min. number of detections:	2
Max. number of detections:	50
Factory setting:	3 Detections

Print log

The analysis electronics continuously records all metal events and errors with date and time. By using the print service, you may print out a log of the records. Appropriate printers and connection cables are available from the detector manufacturer. By standard, the printer is connected to a RS 232 interface.

Print mode (optional)

The menu point **Print mode** will be shown only if the printing service has been activated.

You can select between **„print mode manual„** and **„print mode automatic“**.

„Print mode automatic “will permanently (non-stop) print the current data (metal findings, error The message). The printer has to be permanently in operation with the setting „print mode manual“ the data will be stored and not printed until the menu point „record printing „will follow) is set to „ON“. Please note that only a limited amount of data can be stored. If 75% of the available memory is full a warning note will ask you to print the data. If the is memory is full, the eldest data will be replaced by the current ones.

Print log (optional)

The menu point **Print log** will be shown only if „**print mode manual**“ has been selected.

The analysis electronics of your metal detector records all metal and error messages that occur during operation in the background in the following format:

Example:

```
AMD 05       Conveyor     10.11.2010 16:11:11

Protocol print-out

Plant name:              AMD05

Parameter set:           (1) Sugar
Batch number:            Example Company

-------------------------------------------------
Date         Time                Description
-------------------------------------------------

09.11.2010  07:01:23  Unit ON
09.11.2010  07:05:03  Sensitivity: 80 -> 75
09.11.2010  08:25:00  Metal: -77.78/0.00V 135.00°
09.11.2010  13:01:23  Error on: 19
10.11.2010  15:23:06  Parameter memory: 1 -> 2
```

You can start print log by selecting „**Print log**“.
The printed data should afterwards be deleted from the printing protocol.

Access operating level

Direct access

Press **"OK"** in the main operating menu

see chapter **Operation**

When on the main menu level, you can enter a freely configurable operating menu without right of access with the help of the **direct access**. You have the following options for a **direct selection**:

- **OFF (no menu item):**
  Direct selection not possible
- **one or several menu items from all the menu items available in operating levels 1 and 2:**
  You can reach the selected menu item, e.g. sensitivity, by pressing "**OK**" or "**Lightning button**" in the main menu without access authorisation.
  Mark the desired menu items with "**Cancel**" and confirm with "**OK**".

Access operating level 1

Code operating 1

If access check is set to „**OFF**" you cancel the access code check for operating level 1. With this option chosen the operating level is accessible without entering an access code.

Note:

- Only trained and authorized personnel may adjust the settings of the metal detection device.
- The access code check can **only** be deactivated for **operating level 1**.

Access code:

You can change the access code for the respective operating level.

The factory pre-set access codes can be found at the end of the operating manual under the heading "Access Codes".

Access operating level 2 and Access operating level QM

Access code:

Analogous to menu item **Access operating level → Access operating level 1 → Access code**

Code input Reset (optional)

When Code input Reset is **„ON“,** the metal detector can only be reset by entering the correct code number. The prevents unauthorised persons from resetting the equipment..

Note:

- The request for code input only occurs in **manuel reset mode.**

see chapter **Adjustments → Operating level 2 → Separating parameter → Reset mode**

Code number Reset (optional)

Change the code number.

The factory preset access codes can be found at the end of this operation manual under “Access codes”.

Code input test

On code entry Test „**ON**“, the error messages no. 44 and 47 can only be reset by the correct entry of the code number. This prevents resetting of a faulty detector test by unauthorised personnel.

Code number test

Change the code number.

The factory-set access codes are at the end of this operating manual under „Access Codes“.

Charge number

In this mask the menu item ‘Lot number’ can be activated (ON) or deactivated (OFF) in operating level 1.

Conveyor belt test

The conveyor belt test can be used to ascertain how badly a conveyor belt is contaminated. Depending on that you can determine whether the belt needs to be replaced, whether it is borderline or whether it is still good.

During the conveyor belt test the belt must run and there must not be any products on the belt.

Starting the belt test

Start the test by pressing **Enter**. A message appears: 'Please do not place any product on the belt! Start the belt!' This message must be confirmed by pressing **Enter**.

Belt test running: The maximum signal caused by the belt is displayed. If the belt has completed at least one circuit, the test can be ended by pressing **Enter**. Depending on the maximum signal the message 'Please replace the belt', 'Belt is borderline' or 'Belt is OK' appears.

Settings

Contamination threshold

The contamination threshold is the preset sensitivity during the belt test.

Adjustable from 1% to 100%.

Basic sensitivity

The basic sensitivity is the preset basic sensitivity during the belt test.

Adjustable from 1 to 16.

Limit value tolerance

The limit value tolerance is a specification in percent. The contamination threshold and basic sensitivity together produce a limit in the form of a maximum signal level.

Example: Maximum signal level = 5 V, limit value tolerance = 80%

- If the measured signal level reaches 6 V during the test, the message 'Please replace the belt' appears.
- If the measured signal level reaches 4.5 V during the test (i.e. more than 80% of 5 V), the message 'Belt is borderline' appears.
- If the measured signal level reaches 3.5 V during the test (i.e. less than 80% of 5 V), the message 'Belt is OK' appears.

Adjustable from 1% to 100%.

Container full message

The message can be output as an error or as a warning.

If a time is now entered under **Operating level 2 → Separating parameters → Container filling time**, the sequence is as follows:

With each ejection the ejection time is added to a cumulative ejection time. If this cumulative ejection time reaches 2/3 of the container filling time, warning no. 57 is first output with the text 'Please empty collecting container!' If this warning no. 57 is acknowledged with OK, the cumulative ejection time is reset to 0. If this warning no. 57 is not acknowledged and further ejections occur, then message no. 46 is output with the text 'Collecting container full'. Depending on the configuration this message no. 46 is now output either as an error message or as a warning.

Maintenance and cleaning

7

Work on the device may only be carried out by trained and authorized personnel.

Maintenance

Electronics

- All electronic components are maintenance-free.

Electrical

- Regularly check the connectors of all wires of the metal separator, as well as the wires themselves for damage of any kind.
- Damaged and defective components must be replaced.

Detector

- Please check regularly whether all installation supports of your metal detector are still firmly attached.
- Also check at regular intervals that connecting cables and all screws are tight and that they are not damaged.

Cleaning

General

Before cleaning your metal detector, check the permitted protection type

see chapter **Technology → Technical data**

In order to guarantee operation free of malfunctions, apart from maintenance, cleaning is also necessary in regular intervals. It is recommended to carry out maintenance and cleaning work at the same time.

Cleaning includes removing dust and dirt from all surfaces, gaps and inside the machine.

Please note:

- All casings must be closed.
- All covers must be fitted.
- The sensor surface must fundamentally be kept free from contamination, and in particular from metallic and conducting contaminants.
- None of the electronic cabinets and lids may be cleaned with a high-pressure cleaner.
- Work on the appliance may only be carried out by trained and authorised personnel.
- Observe the corresponding notes and product data sheets provided by the cleaning agent manufacturer for
    - use of the cleaning agents
    - disposal of the cleaning agents in accordance with regulations
    - personal protective equipment

Display

The screen may only be cleaned with a slightly moist, soft cloth. For moistening the cloth use a screen cleaning agent, for example an antistatic foam cleaner.

- Do not use corrosive cleaning agents, chemicals, scouring agents or hard objects that could scratch or damage the screen
- Do not clean the display screen with a high-pressure cleaner!
- Do not immerse the screen in water!

Displays with an attached splash protector may be cleaned with a water jet according to the protection class. The transparent splash protector guards the display against water that is directed towards the display.

The splash protector is available for the **METRON CI** metal detectors. If required, please contact the responsible representative.

Errors and Problems

8

General

The analysis electronics monitors all components necessary for proper functioning. If one measured parameter is outside the valid range, the malfunction is displayed as text.

Once an error message appears, the potential-free contact **Relay 2** (standard configuration, hereinafter referred to as **standby relay**) switches at the same time.

see chapter **Technology → Plug configuration**

The machine is now in error mode.

Certain error messages do not disappear automatically once the source of the error has been remedied.

Error messages can either be acknowledged or cancelled. In both cases, the error message disappears, to change the settings of the electronics, if necessary:

If the error message is acknowledged, the machine goes back into normal mode (standby relay switches to normal mode). If the cause for the error is still present, the machine switches back into the error mode after a short period, and the error message is repeated.

If an error message is cancelled, the machine remains in error mode (standby relay remains in error mode). After a short time period, the error message is repeated.

Please note: The machine switches back to normal mode only once the error has been remedied and the message acknowledged.

Notifications behave analogous to error messages, with the only difference, that the machine does not switch to error mode when they appear (standby relay remains in normal mode).

Error messages and notice

Error 0: reserved

Error 1: „Error during initialisation of the device“

During the initialization phase communication with a CAN-Bus part could not be established.

- Check the CAN-Bus ends for correct termination.

see chapter **Technology → Plug configuration → CAN-Bus**

- Check the CAN-Bus lines and connections for breaks / short circuits.
- Check the operation of the devices connected to the CAN-Bus

Notice 2: „Wrong code number“

You have entered the wrong code number for the operating level chosen.

Error 3-6: reserved

Error 7: „Separator: Normal position“

After separating items the separation device did not return to its normal position.

Check the functions of your separation device. If operating normally, the cause of the error message could also be a damaged initiator/sensor or a damaged initiator/sensor connection cable. Check the initiator/sensor function and, if need be, check the cable connection of the initiator/sensor.

see chapter **Maintenance and Cleaning → Ejection mechanics**

Error 8: „Separator: Separating position“

After a metal message was displayed the separating device did not reach the separating position:

Check the function of your separating device. If it works normally, the cause of the error message may also be a damaged initiator/sensor or a damaged initiator/sensor connection cable. Check the initiator/sensor function and, if need be, check the cable connection of the initiator/sensor.

see chapter **Maintenance and Cleaning → Ejection mechanics**

Warning 9: „Metal detection deactivated“

The metal detection was deactivated with the help of connection 14.

see chapter **Assembly → Connection**

Notice 10: “Please remove metal parts”

The metal detector has identified a metal part.

Once the metal part has been removed, each metal notification on the display must be acknowledged by pressing “**OK**”.

Note: if the Security Reset System (SRS) is activated, the message appears again if there is still a metal part in the detector (option).

Warning 11: “No serial number exists“

The serial number has not been entered, or the memory is damaged. Contact the service department.

Contact the service department.

Error 12:“Print buffer is 95% full. Start printout!”

The log memory is 95% full. To avoid loss of log data, you should start a log printout. This error message can only be acknowledged when you subsequently delete the printed data from the print log.

The error message must first be suppressed with the CANCEL key in order to be able to switch to the print menu.

see **Operating level QM → Print → Print log**

Error 13: „Check input optical sensor“

The input optical sensor emits a signal that is longer than the specified max. product length.

- Check the function of the optical sensor
- Check the specified max. product length

See chapter **Settings → Operating level 3 → Functional block → Input optical sensor → max. product length**

Error 14: reserved

Error 15: „Specified separation delay is too short“

You have specified too short a separation delay.

Please check the separation delay.

See chapter **Settings → Operating level 2 → Separation parameters → Separation delay**

If the error message still appears, contact the service department.

Error 16: reserved

Error 17: „Transmitter check: Amplifier without load“

The transmitter amplifier is not burdened.

Check the transmitter connection cable for breaks and control the contact connections of the transmitter box.

see chapter **Technology → Plug configuration → Transmitter connection**

Error 18: „Transmitter check: Amplifier overloaded“

The transmitter amplifier is overloaded.

Check the transmitter connection cables for short circuits and check the contact connections of the transmitter box.

see chapter **Technology → Plug configuration → Transmitter connection**

Error 19: „Receiver check: Voltage too low“

The voltage of the receiver exceeds the limits.

Check the receiver connection cable for breaks and check the connections and contacts of the receiver box.

see chapter **Technology → Plug configuration → Receiver connection**

Error 20: „Receiver check: Voltage too high“

The voltage exceeds the tolerances.

Is there a big metal part in or directly in front of the search coil?

Check the receiver connection cable for short circuits and check the connections and contacts of the receiver box.

see chapter **Technology → Plug configuration → Receiver connection**

Error 21: „Output voltage control: 24V overload“

Load exceeds maximum load (300mA) of switch outputs.

Warning 22: „Battery voltage too low. Please replace“

The battery voltage of the controller board is too low. The battery has to be replaced. Please turn to our service department.

see chapter **Errors and Problems → Service**

Error 23-25: reserved

Notice 26: „TEST diverter ON: ... ms OFF: ... ms“

After the test ejection has completed, the screen will display message 26 for roughly 15 seconds. The message informs you about the measured reaction times for switching the ejection mechanics on and off. You can confirm the message before the time runs out by pressing **“Enter”.**

Error 27: „Separator: activation time“

The separation device has not reached its separating position within the required time-period after detecting metal.

Check the function of your separating device. If it works normally, the cause of the error message may also be a damaged initiator/sensor or a damaged initiator/sensor connection cable. Check the initiator/sensor function and, if need be, check the cable connection of the initiator/sensor.

see chapter **Maintenance and Cleaning → Ejection mechanics**

Error 28: „Separator: setback time“

The separation device has not reached its initial position within the required time-period.

Check the function of your separating device. If it works normally, the cause of the error message may also be a damaged initiator or a damaged initiator/sensor connection cable. Check the initiator/sensor function and, if need be, check the cable connection of the initiator/sensor.

see chapter **Maintenance and Cleaning → Ejection mechanics**

Error 29: „Separator: cable rupture“

The evaluation electronics continuously controls the function of all devices attached and can detect a defective or misconnected cable. If an error message “Cable break” is displayed, you should check the connection concerned for proper cabling and the connection cable for electric passage.

Error 30-37: reserved

Warning 38: „Contamin.. Detektionen in .. mm:ss!“

When checking the contamination degree of a product flow, a warning is sent when the set criteria are reached (number of metal occurrences per time interval).

Error 39-41: reserved

Warning 42: „Please start detector test “

Request for detector test.

cee chapter **Adjustment → Operating level QM → Detector test**

Notice 43: „Detector test successful“

During testing metal is detected.

see chapter **Adjustment → Operating level QM → Detector test**

Error 44: „Detector test failure: Timeout”

During testing **no** metal is detected.

see chapter **Adjustment → Operating level QM → Detector test**

Error 45: reserved

Warning 46: “Collector bin full”

The collector bin for ejected material is full.

Empty the collector bin and confirm the notification by pressing the “**OK**” key. The **Cumulative ejection time** is re-set automatically.

Please note:
If the collector bin is not yet full, or its contents have already spilled over, the **Cumulative ejection time** setting is incorrect.

see chapter **Adjustment → Operating level 2 → Reject parameter → Cumulative ejection time**

Error 47: „Detector test failure: Tolerance“

This error message is issued if the signal of a standard test piece does not lie within the preset tolerance.

see chapter **Adjustment → Operating level QM → Detector test**

Error 48: „Pressure switch: Pressure too low“

There is not enough pressure in order to operate the separation device.

Check the pressurized-air supply.

Important note:
This error message appears even it the plant is optionally equipped with a compressed air shutoff valve and is shut off (also during emergency shutdown). On restart, the error message disappears.

See chapter **Assembly → Connections → Pressurised air supply**

Error 49-50: reserved

Warning 51: “Print buffer is 75% full. Start printout!”

The log memory is 75% full. To avoid loss of log data, you should start a log printout and subsequently delete the printed data from the print log.

see **Operating level QM → Print → Print log**
see also chapter **Errors and problems → Error messages and notices → Error 12**

Error 52-56: reserved

Warning 57: „Please empty collecting container!“

With each ejection the ejection time is added to a cumulative ejection time. If this cumulative ejection time reaches 2/3 of the container filling time, warning no. 57 is first output with the text ‘Please empty collecting container!’ If this warning no. 57 is acknowledged with OK, the cumulative ejection time is reset to 0. If this warning no. 57 is not acknowledged and further ejections occur, then message no. 46 is output with the text ‘Collecting container full’. Depending on the configuration this message no. 46 is now output either as an error message or as a warning.

see chapter **Adjustment → Operating level QM → Container full message**

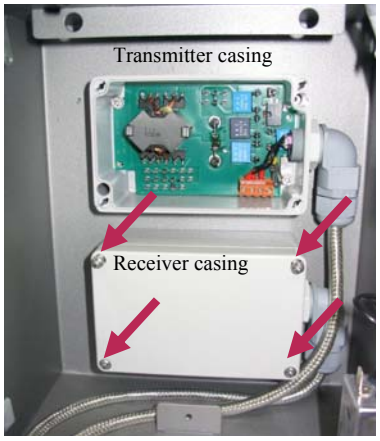
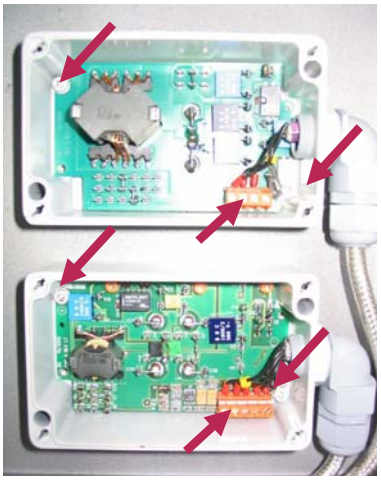
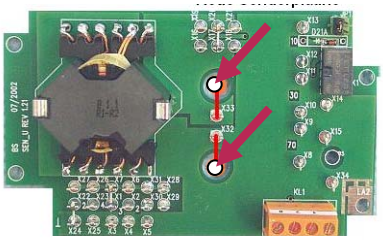
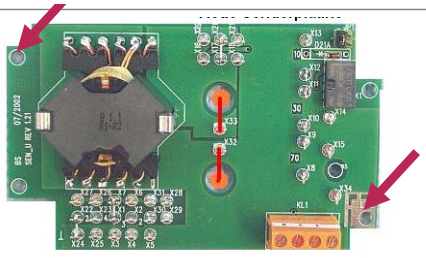
Notice 58: "Please update FPGA code to version Lattice ...”

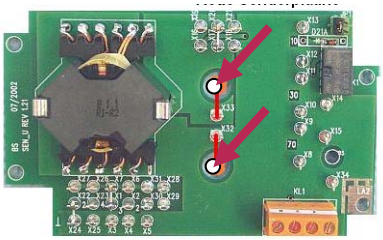
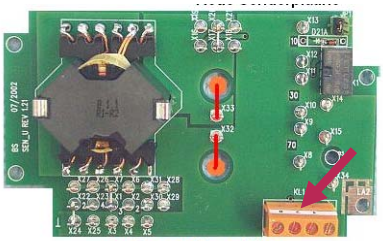
The FPGA code does not match the current software version. Update the FPGA code.

see **Operating level 2 → SD-Card → FPGA code update**

Exchanging the transmitter or receiver circuit board

The exchange of the transmitter or receiver PCB is a very elaborate procedure.
Please consult your responsible service organisation!

1. Release the quick-fix screws (4 pieces) of the transmitter or receiver casing cover by turning them a quarter of a turn to the left, then remove the cover.	
2. Disconnect the cable connections and remove the screws from the transmitter or receiver PCB.	
3. Unsolder the solder points using a large, powerful soldering iron.	
4. Insert the new transmitter or receiver PCB and fix it with the screws. The screws must be inserted into the marked holes (earth connection at bottom right!)	

5. The wire bridges are soldered using the coil connecting wires. Please be sure to make a good soldered connection.	 Coil connection wires Wire bridges
6. Reconnect the cables, making sure to connect correctly (see cable numbering). see chapter **Technology → Plug configuration**	 Coil connection wires Wire bridges
7. Reassemble the metal detector in the reverse order.	

Mains supply

It is essential for the mains LED to be lit in order for the evaluation circuit to function properly.

Net-LED / Main supply-LED dark?

1. Step: Check the mains supply!

Range of the mains supply:		*Customized version:*
Continuously:	100 to 240 V AC 50 / 60 Hz	*Operating voltage:20 to 36 V DC*
Power protection:	max.10 A	*Power protection:max.2 A*

2. Step: Check the device fuse!

In order to protect the evaluation electronics a time-lag 1,25A fuse has to be used.

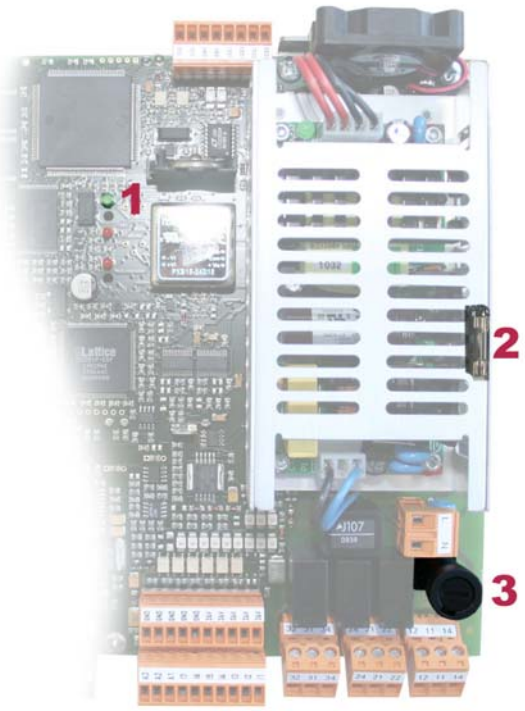
- Fuse o.k.

  Mains supply not o.k.
  Measures:
  - Check the voltage actually connected to the **mains supply**. Does the voltage meet the requirements?
  - Contact our service department

see chapter **Errors and problems→ Service**

- Fuse defective

  Replace the device fuse with a spare fuse located on the electronics board. (1,25A, 5x20 mm according to DIN)



1. Main supply LED
2. Time-lag spare fuse, 1,25A, 5x20 mm according to DIN
3. Device fuse, 1,25A, 5x20 mm according to DIN

Service

Our trained personnel will be glad to help you removing errors and problem at your metal detector.

Please find the contact person responsible for you on the type plate on the seeker head. The type plate is on the backside of the electronic control box cover and on the outside of the metal detector.

Before contacting our service department, please fill-in the following form thoroughly. This will help our service technicians to find the error.

The serial number can be found on the respective device as described below or under the menu item **version info**.

see chapter **Adjustment → Operating level 2 → Version info**

AB-number (from **Adjustment → Operating level 2 →read version** info)

Serial number device

The device's serial number you can find on the type plate. It is an 8-digit number and a 2-digit character combination. (for instance. 2010-1112-MN)

Serial number electronics

The electronics serial number you can find on the electronics casing box or on the power supply transformer or on the board. It is a combination of a single letter and a 7-digit number (e.g. A70-00022).

Product description

(type, temperature, impurities, ...)

Detailed error description

Measures taken so far

Have there been prior service calls? **yes** **no**

If yes, which order number and/or error description?

Technical data

Operating voltage:	100 to 240 V AC 50 / 60 Hz
Special version:	*20 to 36 V DC* *Power protection: max. 2 A*
Current load:	max. 300 mA
Device fuse:	1,25A time-lag, 5x20 mm according to DIN
Mains protection:	max. 10 A
Protective system:	IP 54 (optional IP 65 at stainless steel) Coil-CI at IP 66
Temperature range:	
Operating:	-10° to +50° C
Storage/Transportation:	-10° to +60° C
Humidity:	up to 100 % without condensation water
Ejection time:	adjustable from 0,1 s to 10 s
Mains connection:	ca. 1,8 m cable with safety plug (US-version with US-standard plug)
Lacquering:	Structural lacquer RAL 3027 or customized lacquer (as desired)
Material:	
Electronics casing box:	Steel sheet 1,5 mm, varnished, (optional Stainless Steel polished, grain 240), weight incl. Electronics ca. 6 kg

Plug configuration

Electric mains

Contact L1, N

Electric mains voltage range:

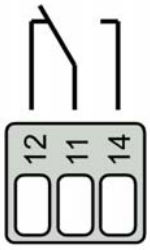
Continuously: 100 to 240 V AC
50 / 60 Hz

Customized versions:

Operating voltage: 20 to 36 V DC

see too chapter **Assembly → Connection**

Relay 1 (switches when metal is detected)

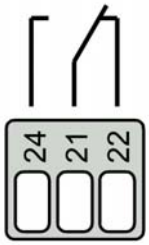


Contacts 12, 11, 14

Dead state: Contacts 11 and 12 closed

Contact load: U~ 250V Imax 3A

Relay 2 (switches when an error is detected)

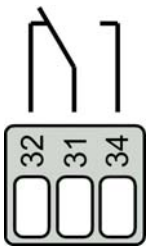


Contacts 24, 21, 22

Dead state: Contacts 21 and 22 closed

Contact load: U~ 250V Imax 3A

Relay 3



Contacts 32, 31, 34

Dead state: Contacts 31 and 32 closed

Contact load: U~ 250V Imax 3A

Terminal block

Application-relevant intakes and outlets are configured using the terminal block. Depending on application, different terminal blocks may be factory pre-set. The installed terminal block of your application can be selected using the menu item **Version info** in **Operating level 2**.

see chapter **Adjustments → Operating level 2 → Version info**

Attention:
max. load for all in- and outputs: 300mA
Outputs (A1, A2, A3), Inputs (I1, I2, I3, I4, I5, I6, I7)

Configurations of terminal block 1:

I1	Initiator / switch normal position
I2	Initiator / switch reject position
I3	Pressure monitoring
I4	Input light barrier
I5	Shaft encoder
I6	External reset key
I7	free
A1	24V active output: metal
A2	24V active output: detector active
A3	free

Configurations of terminal block 2:

I1	Initiator / switch normal position
I2	Offline“- key (metaldetection disactivated)
I3	Pressure monitoring
I4	Input light barrier
I5	Shaft encoder
I6	External reset key
I7	free
A1	24V active output: metal
A2	24V active output: detector active
A3	free

Configurations of terminal block 3:

I1	Offline“- key (metaldetection disactivated)
I2	Parameter set switch BCD Code Bit 0
I3	Signal conveyor stop (stop „interf. signal timer“)
I4	Parameter set switch BCD Code Bit 1
I5	External product change or SPS (only use potential free contacts) Parameter set switch BCD Code Bit 2 **(→ see table at end)**
I6	External reset key
I7	free
A1	24V active output: metal
A2	24V active output: detector active
A3	free

Configurations of terminal block 4:

I1	Initiator / switch normal position
I2	Initiator / switch reject position
I3	Pressure monitoring
I4	Input light barrier
I5	Shaft encoder (Initiator 1)
I6	Shaft encoder (Initiator 2)
I7	free
A1	24V active output: metal
A2	24V active output: detector active
A3	free

Configurations of terminal block 5:

I1	Initiator / switch normal position
I2	Initiator / switch reject position
I3	Pressure monitoring
I4	Offline“- key (metaldetection disactivated)
I5	Test key eject flap
I6	External reset key
I7	free
A1	24V active output: valve reject flap
A2	24V active output: detector active
A3	free

Configurations of terminal block 6:

I1	Initiator / switch normal position
I2	Parameter set switch BCD Code Bit 0
I3	Pressure monitoring
I4	Parameter set switch BCD Code Bit 1
I5	Test key eject flap
I6	External product change or SPS (only use potential free contacts) Parameter set switch BCD Code Bit 2 **(→ see table at end)**
I7	free
A1	24V active output: metal
A2	24V active output: detector active
A3	free

Configurations of terminal block 7:

I1	Level sensor for collecting vessel
I2	Product monitor
I3	Pressure monitoring
I4	Input light barrier
I5	Shaft encoder
I6	not in use
I7	free
A1	24V active output: metal
A2	24V active output: detector active
A3	free

Configurations of terminal block 8:

I1	Parameter set switch BCD Code Bit 0
I2	External product change or SPS (only use potential free contacts) Parameter set switch BCD Code Bit 1 **(→ see table at end)**
I3	Pressure monitoring
I4	Input light barrier
I5	Shaft encoder
I6	External reset key
I7	free
A1	24V active output: metal
A2	24V active output: detector active
A3	free

Configurations of terminal block 9:

I1	Initiator / switch normal position
I2	Initiator / switch reject position
I3	Pressure monitoring
I4	Spark alarm
I5	Test key eject flap
I6	External reset key
I7	free
A1	24V active output: valve reject flap
A2	24V active output: detector active
A3	free

Configurations of terminal block 10:

I1	Offline“- key (metaldetection deactivated)
I2	Parameter set switch BCD Code Bit 0
I3	Setup mode (conveyor belt)
I4	Parameter set switch BCD Code Bit 1
I5	External product change or SPS (only use potential free contacts) Parameter set switch BCD Code Bit 2 **(→ see table at end)**
I6	External reset key
I7	free
A1	24V active output: metal
A2	24V active output: detector active
A3	free

Configurations of terminal block 11:

I1	Initiator / switch normal position
I2	Initiator / switch reject position
I3	Pressure monitoring
I4	Offline“- key (metal detection deactivated)
I5	Test key eject flap
I6	Learn vibrations
I7	free
A1	24V active output: valve reject flap
A2	24V active output: detector active
A3	free

Configurations External product change or SPS Terminal block 3 or 6

(only use potential free contacts)

	BCD Code	BCD Code	BCD Code
Parameter-set	**Bit 2**	**Bit 1**	**Bit 0**
1	0	0	0
2	0	0	**1**
3	0	**1**	0
4	0	**1**	**1**
5	**1**	0	0
6	**1**	0	**1**
7	**1**	**1**	0
8	**1**	**1**	**1**

0 = Contact open = 0V
1 = Contact closed = +24V

Terminal block 8

(only use potential free contacts)

	BCD Code	BCD Code
Parameter-set	**Bit 1**	**Bit 0**
1	0	0
2	0	**1**
3	**1**	0
4	**1**	**1**

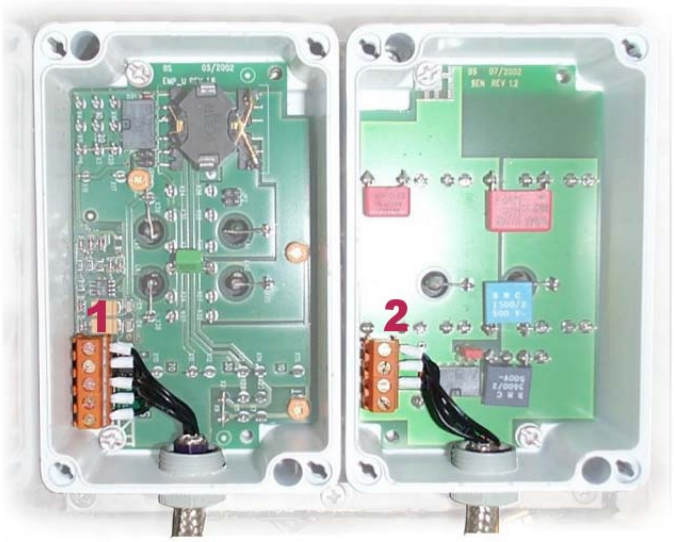
0 = Contact open = 0V
1 = Contact closed = +24V

Transmitter- / Receiver connection

Transmitter / Receiver connector casings

Transmitter connector and receiver connector casings are located directly on the outside of the coil (underneath the casing on the coil bottom for **CI-Coil**).

Receiver connector casings Transmitter connector casings

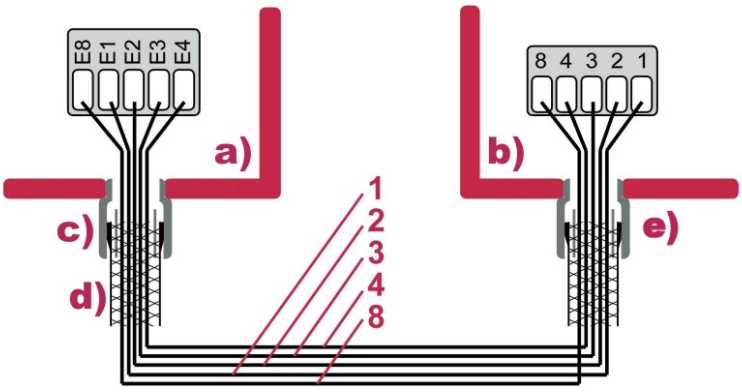


1. Receiver connection
2. Transmitter connection

Toward electronics Toward electronics

Receiver connection

Contacts E8, E1, E2, E3, E4



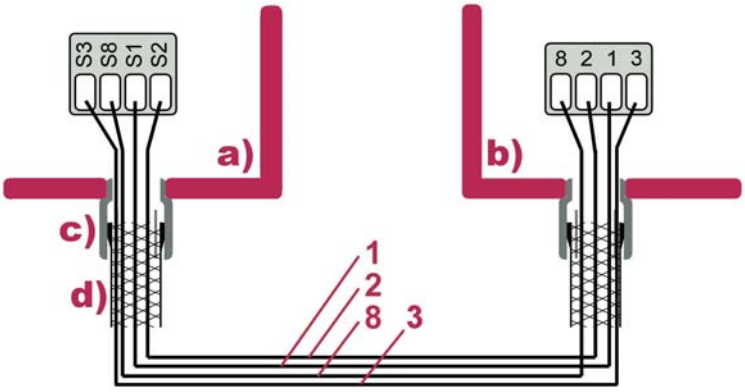
a) Elektronics
b) Detector / Receiver connection housing
c) EMV-screws
d) Shielding
e) Flange plug (optional)

Optional: Flange plug 6 pin, brass

Elektronic	Elektronic	Elektronic	Elektronic
E1	1	1	1
E2	2	2	2
E3	3	3	3
E4	4	4	4
-	-	5	-
E8	8	6	8

Transmitter connection

Contacts S3, S8, S1, S2



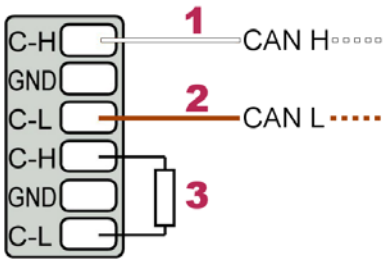
a) Electronics
b) Detector / Transmitter connection housing
c) EMV-screws
d) Shielding
e) Flange box (optional)

Optional: Flange box 6 pin, brass

Electronic	Conductor	Plug	Detector
S1	1	1	1
S2	2	2	2
S3	3	3	3
-	-	4	-
-	-	5	-
S8	8	6	8

CAN-BUS (optional)

Contact 2x C-H, 2x C-L

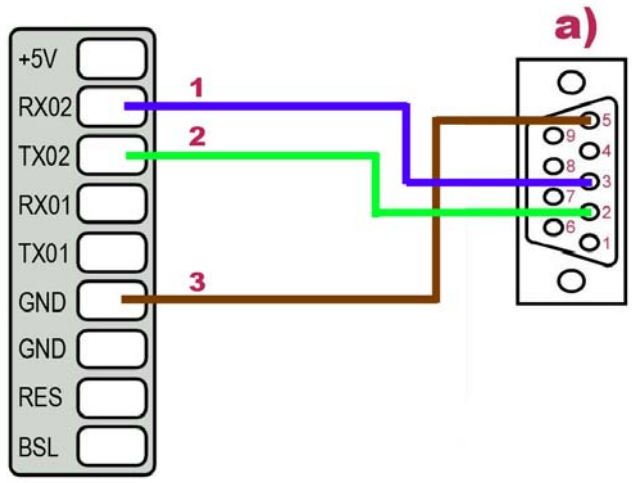


1. CAN H (white)
2. CAN L (brown)
1. **Note:** If you use the CAN-Bus for communicating with peripheral equipment you have to make sure, that the CAN-Bus is terminated at both ends with a **120 Ohm** resistor in order to prevent reflections at the bus ends.

Serial interface

The serial interface is pre-wired in the factory if necessary.

Configuration of the RS-232 serial interface:

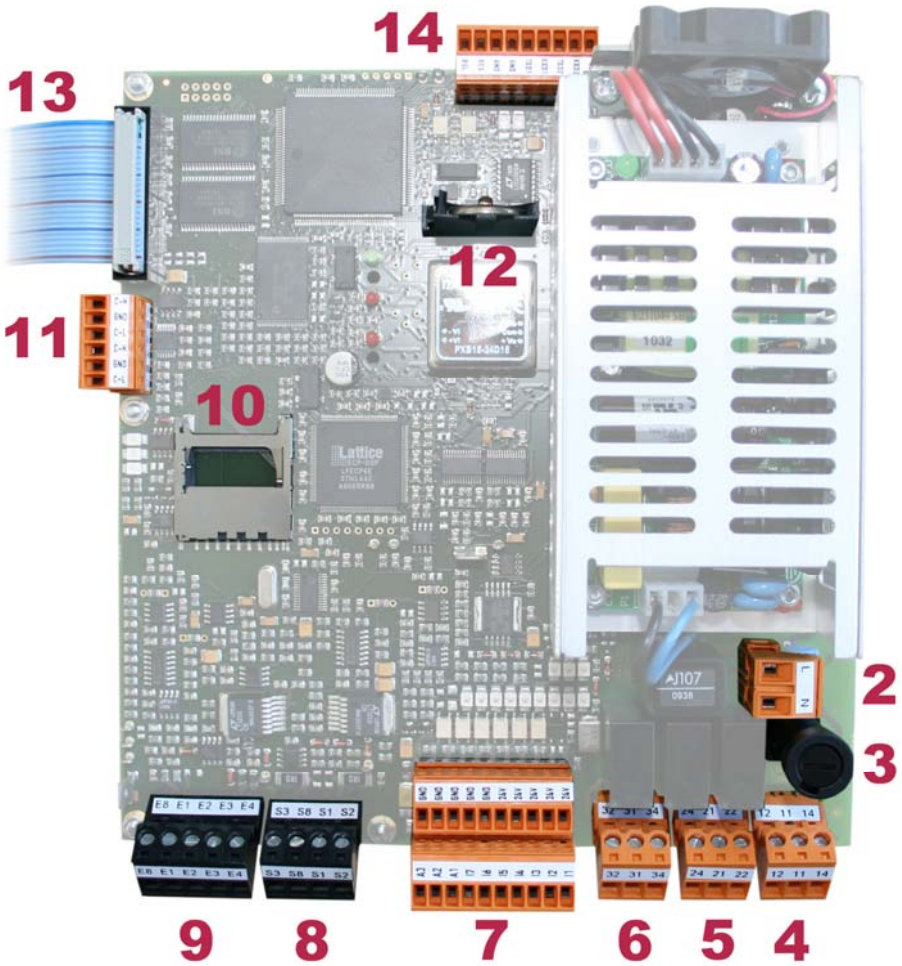


1. RX02 (blue)
2. TX02 (green)
3. GND (brown)

a) e.g. user connection, 9-pin Sub-D

Key plan

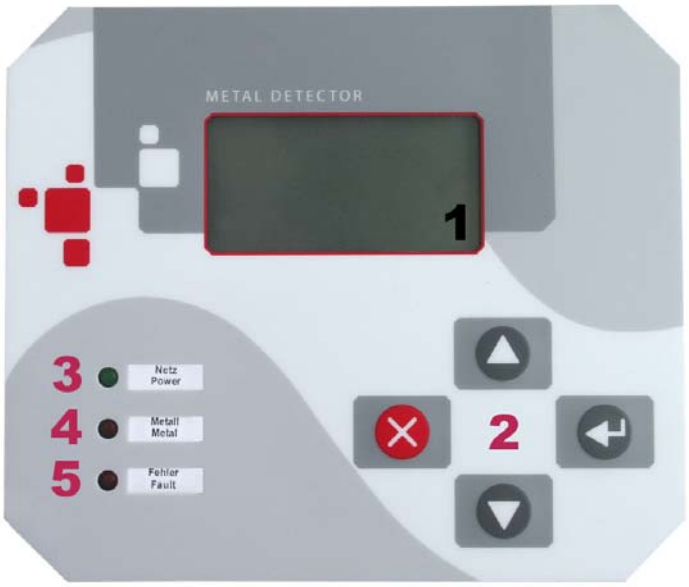
Electronics



1. Time-lag spare fuse 1,25A, 5x20 mm according to DIN
2. Mains supply
3. Time-lag device fuse 1,25A, 5x20 mm according to DIN
4. Relay 1
5. Relay 2
6. Relay 3
7. Terminal block
8. Transmitter connection
9. Receiver connection
10. SD Card reader (Smaller or equal to 2 GB, not with suffix ‘HC’)
11. CAN-Bus connection
12. Battery
13. Display connection
14. Serial interface (assigned for service purposes)

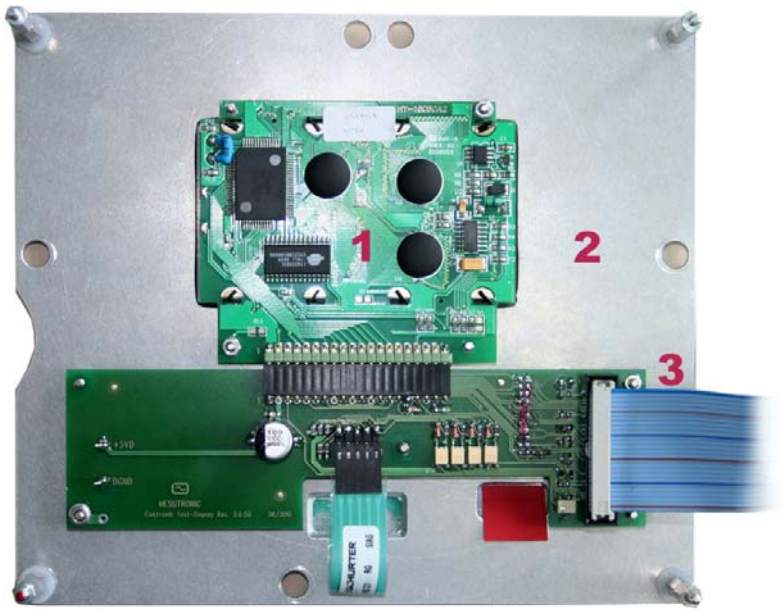
4 Line Display

Front



1. Display indication
2. Operating keys
3. Mains LED
4. Metal LED
5. Error LED

Back



1. Display electronics
2. Assembly plate
3. Electronics Connection

Spare part

10

Danger due to non-original spare parts!

- **All wearing parts are excluded from the warranty (i.e. moved parts and/or parts in contact with the product)!**
- **Only original spare parts made by the manufacturer may be used.**
- **The warranty will become null and void in the case of non-compliance!**

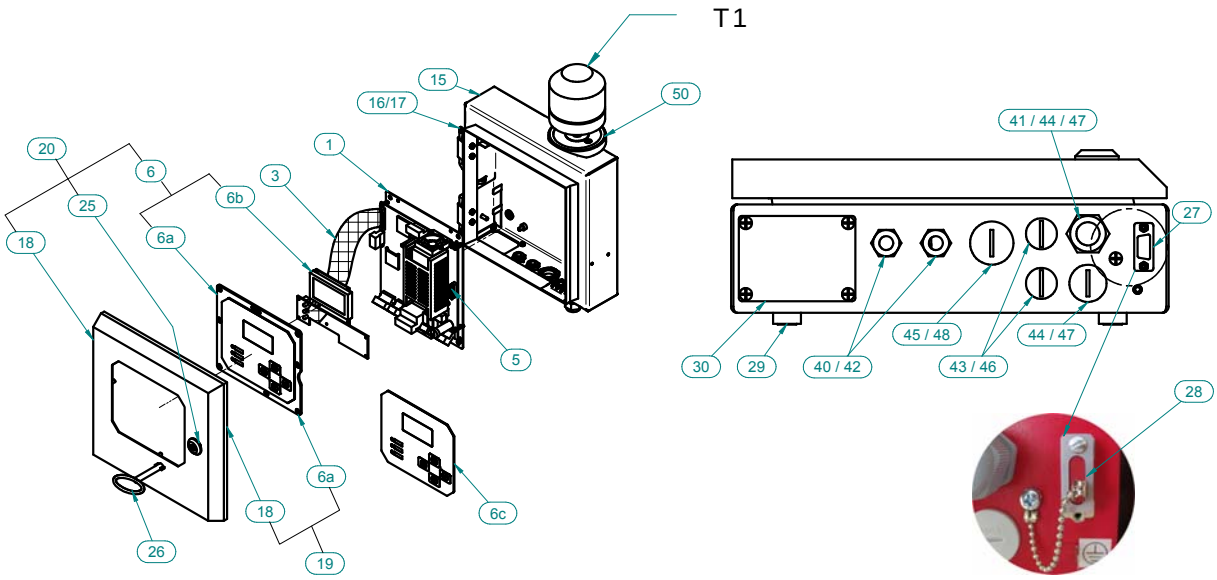
Wrong or faulty spare parts can lead to damage, malfunctions or total failure and can impair safety (danger of injury).

Please note that various spare parts are specially manufactured for a specific customer or machine and therefore have a longer delivery time.

Spare parts can be obtained through agencies or directly from the metal detector manufacturer.

Electronic AMD 5.2

Spare part list: XXX 0000 035 L Rev.: 02 Drawing: XXX 0000 034 E Rev.: 02



T1 Optional: signal generator, round IP 65, with high header

Ref.-No.	Spare part	Item.-No	Comment
1	Electronic AMD 5.2 with mounting plate without quick-action closure	350988-1	State serial number
3	Flat line for 4 line display and 4 Line screen	500165	Length: 250 mm
4			
5	Spare fuse 1,25A slow, 5x20 mm acc. DIN	200616	
6	Text display, complete. (Text display on PCB and membrane for text display on base plate)	350990	
6a	Base plate with membrane text display	350989 [1)]	Read notice
6b	Electronic text display, complete	400125	
6c	Foil text display	200596 [1)]	Read notice
7			
15a	Housing basepart, painted	250651*	State colour
15b	Housing basepart, Stainless Steel	250652	
16a	Hinge with hinge pin, zinc.	301 532	
16b	Hinge with hinge pin, Stainless Steel	301 824	
17	Lock washer, Stainless Steel	301 530	
18a	Lid, painted	260680*	State colour
18b	Lid, Stainless Steel	260503	
19a	Lid for 4 Line display, painted and assembled - (consists of item 18a and mounted item 6b)	260680 + 350989	not shown
19b	Lid for 4 Line display, stainless steel and assembled	260503 + 350989	not shown

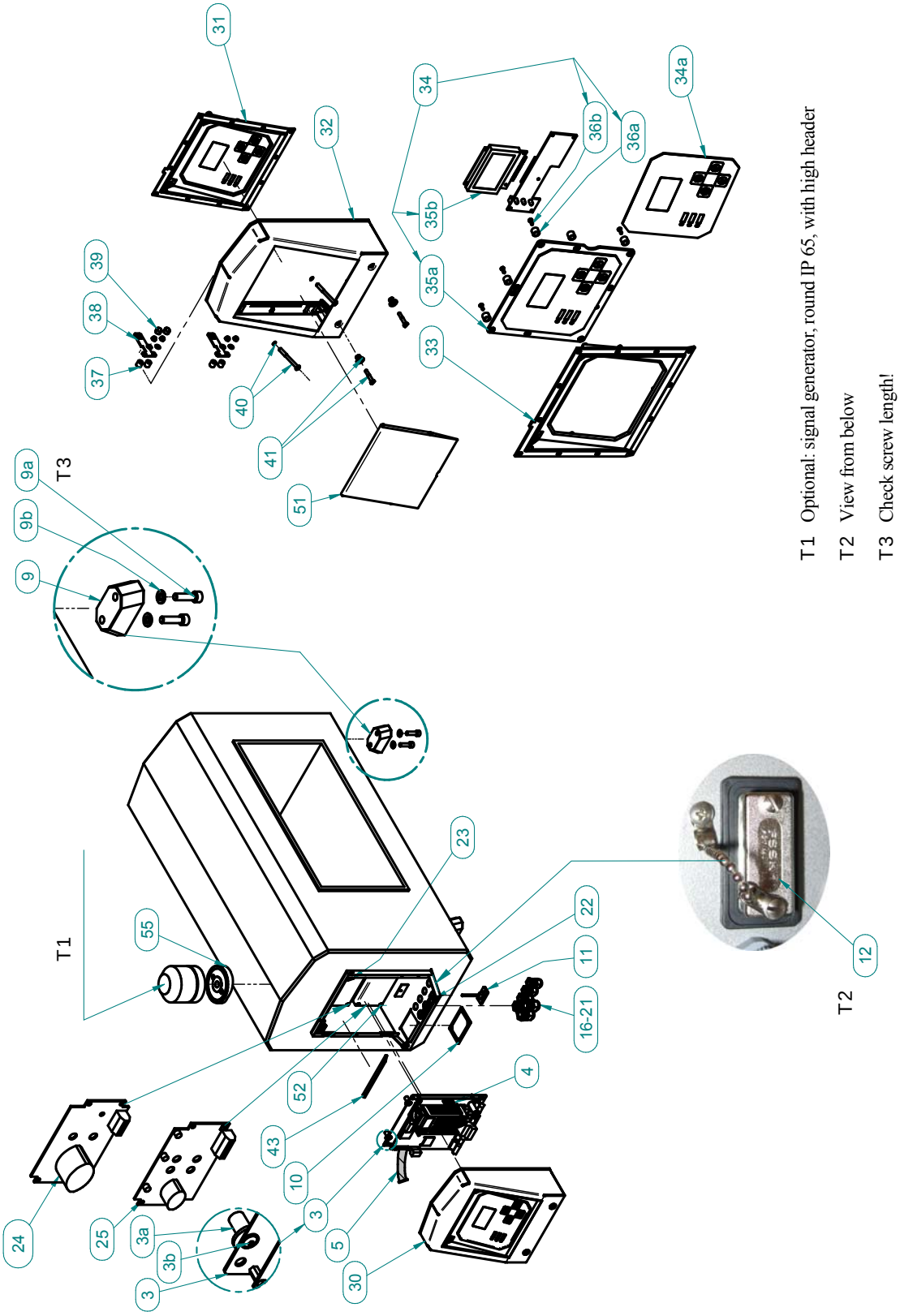
Ref.-No.	Spare part	Item.-No	Comment
	(consists of item 18b and mounted item 6b)		
20a	Lid, painted complete	350991*	State colour
20b	Lid, Stainless Steel – complete	350992	
25	Closure with locking latch, black	301536	
26	Two-Way-Key	300152	
27a	Service-interface, standard	350323	
27b	Service-interface, IP 67	350324	
28	Dust cap, comply. (with chain, Pan-head screw, Dust cap fixing, Holding disc)	350325	
29	Insulating socket M5 (1 set = 4 pieces)	350241	
30	Adapting plate "Standard" with seal	350247	
40	Screwed cable gland EMV M 16 x 1,5 Brass Clamping area 5-9mm	301691	
41a	Screwed cable gland M 20 x 1,5 polyamide Clamping area 6,5-9 mm	301306	
41b	Screwed cable gland M 20 x 1,5 Brass Clamping area 6,5-9 mm	301399	
42	Counter nut EMV M 16 x 1,5 Brass	301656	
43a	Counter nut M 16 x 1,5 polyamide	300612	
43b	Counter nut M 16 x 1,5 Brass	301400	
44a	Counter nut M 20 x 1,5 polyamide	300613	
44b	Counter nut M 20 x 1,5 Brass	301401	
45a	Counter nut M 25 x 1,5 polyamide	300614	
45b	Counter nut M 25 x 1,5 Brass	301402	
46a	Screw plug M 16 x 1,5 polyamide	301018	
46b	Screw plug M 16 x 1,5 Brass	300615	
47a	Screw plug M 20 x 1,5 polyamide	300984	
47b	Screw plug M 20 x 1,5 Brass	300616	
48a	Screw plug M 25 x 1,5 polyamide	301019	
48b	Screw plug M 25 x 1,5 Brass	300617	
50	Bracket for “Signal head, round and with a flat footing”	380113	Option

[1] **Warning:** Changing the foil and membrane foil front plate is very complicated. Please contact our customer service.

*** When spare parts are requested, please state serial number, acknowledgement number and detector type!!!**
All consumable parts are excluded from the warranty (i.e. moved parts and/or parts in contact with the product)!
Only original spare parts made by the manufacturer may be used.
The warranty will become null and void in the case of non-compliance!

Detector CI-Coil

Spare part drawing number: CI 0000 026 E-Rev03



CI-Coil BA 14 with AMD 5.2

Spare part list: CI 0000 027 L Rev.: 03 Drawing: CI 0000 026 E Rev.: 03

Ref.-nr.	Spare part	Item.-No.	Comment
3	AMD 5.2 evaluation electronics on mounting plate with quick acting closure	350988-3*	
3a	Blind insert nut	304021	
3b	Screw	302225	
4	1,25 mA replacement fuse, slow-blow, 5x20 mm according to DIN	200616	
5	Flat-ribbon cable for text display	500165	Length: 250 mm
9	Detector foot	301714	
9a	Flat fillister-head screw DIN 912 – M8 x 30 – VA	301718	
9b	Washer DIN 125 – A 8.4 – VA	301290	
10	Adapter plate, standard with seal	350247	
11	Service – interface	350324	
12	Dust cover, screened with seal	350452	
16	Threaded cable connection M16 x 1,5	300609	Polyamide
17	Threaded cable connection M20 x 1,5 – Clamping area 6,5 - 9 mm	301306	Polyamide
18	Locking screw M20 x 1.5	300984	Polyamide
19	Locking screw M16 x 1.5	301018	Polyamide
20	Lock nut M20 x 1.5	300613	Polyamide
21	Lock nut M16 x 1.5	300612	Polyamide
22	Snap nut NUT 8415A DK – M5	301715	
23	Snap nut NUT 8376A DL – M6	301716	
24	Transmitter electronics complete assembled	350281 [1)]	*
25	Receiver electronics complete assembled	350282 [1)]	*
30a	Cover for display box for text display, complete without splash guard (consisting of the pos. 31 / 32 / 39 / 41)	351040-1	
30b	Cover for display box for text display, complete with splash guard (consisting of the pos. 31 / 32 / 39 / 41 / 52)	351040-2	
31	Display unit compl. (consists of ref no. 33 / 34 / 35a / 35 b /36a / 36b)	351041	
32	Display housing lid with Seal	351042 [2)]	Observe note

Ref.-nr.	Spare part	Item.-No.	Comment
33	Display housing part 2	303841 [2)]	Observe note
34	Adaptor plate assembled (consists of ref no. 35a / 35 b /36a / 36b)	350990 [2)]	Observe note
35a	Foil on adaptor plate with bolts	350989 [2)]	Observe note
35b	Electronics 4 Line Display	400125	
35c	Foil 4 Line Display	200596 [2)]	Observe note
36a	Clamping sleeve	301720	
36b	Screw	301741	
37	Spacer bush	301721	
38	Strap hinge	301722	
39	Schutzkappe	302713	
40	Fixing screw M5 – VA with sealing element (1 set = 2 pieces)	350380	
41	Fixing screw M6 x 55 – VA with sealing element (1 set = 2 pieces)	350381	
43	Display housing support	301743	
51	Protective cover con (optional)	350311	
52	Quarter-turn fastener with spring (attachment of lid to transmitter – receiver housing) (1 set = 4 pieces)	301838	
55	Mount with seal for warning generator, round with low socket IP 65 (**optional**)	380113	

[1)] Exchange only after consulting the Service Dept.

[2)] Warning: Changing the membrane front plate is-very complicated. Please contact our customer service.

*** When spare parts are requested, please state serial number, acknowledgement number and detector type!!!**

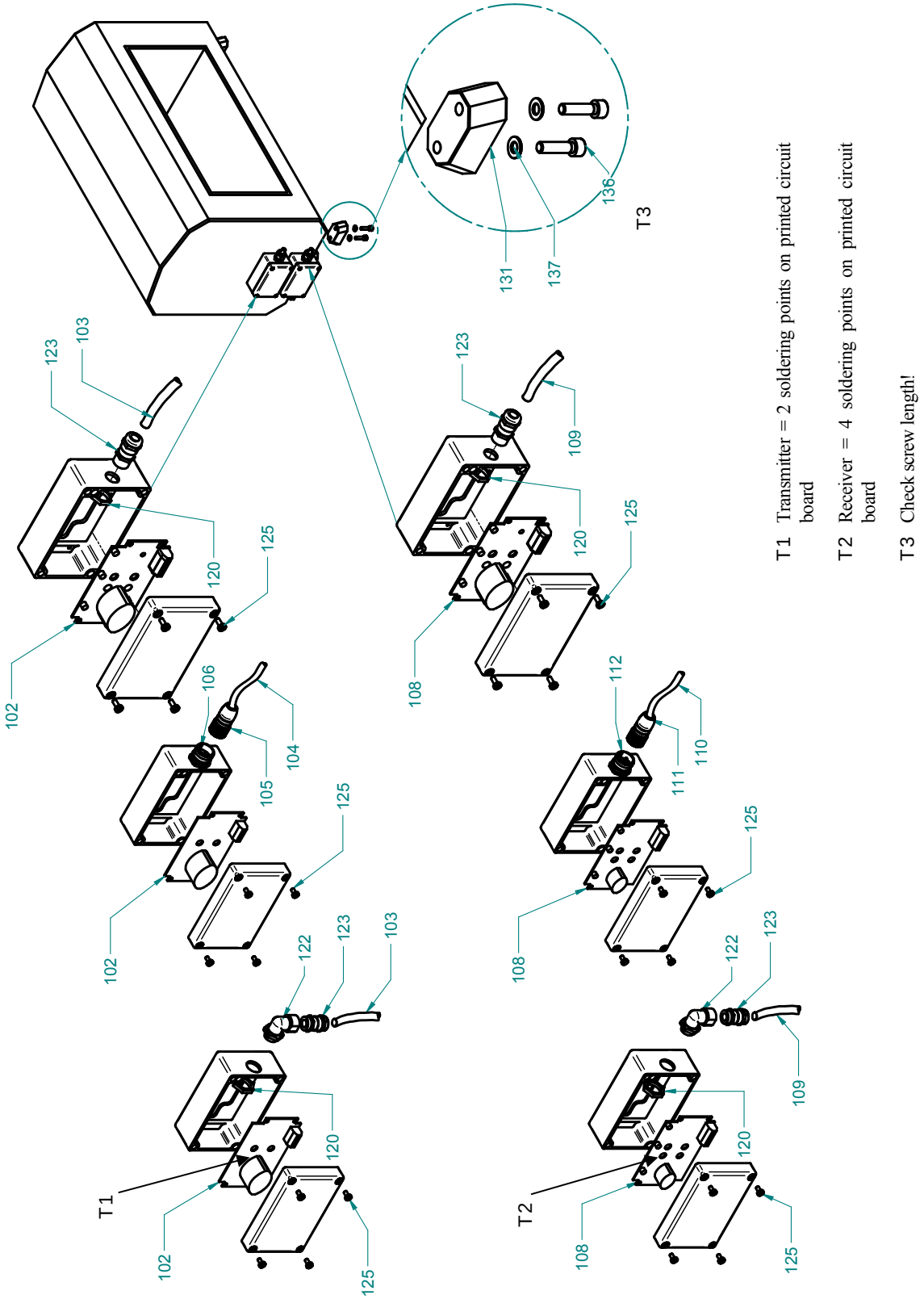
All consumable parts are excluded from the warranty (i.e. moved parts and/or parts in contact with the product)!

Only original spare parts made by the manufacturer may be used.

The warranty will become null and void in the case of non-compliance!

Detector C-Coil

Spare part drawing number: C 0500 0000 003 EA



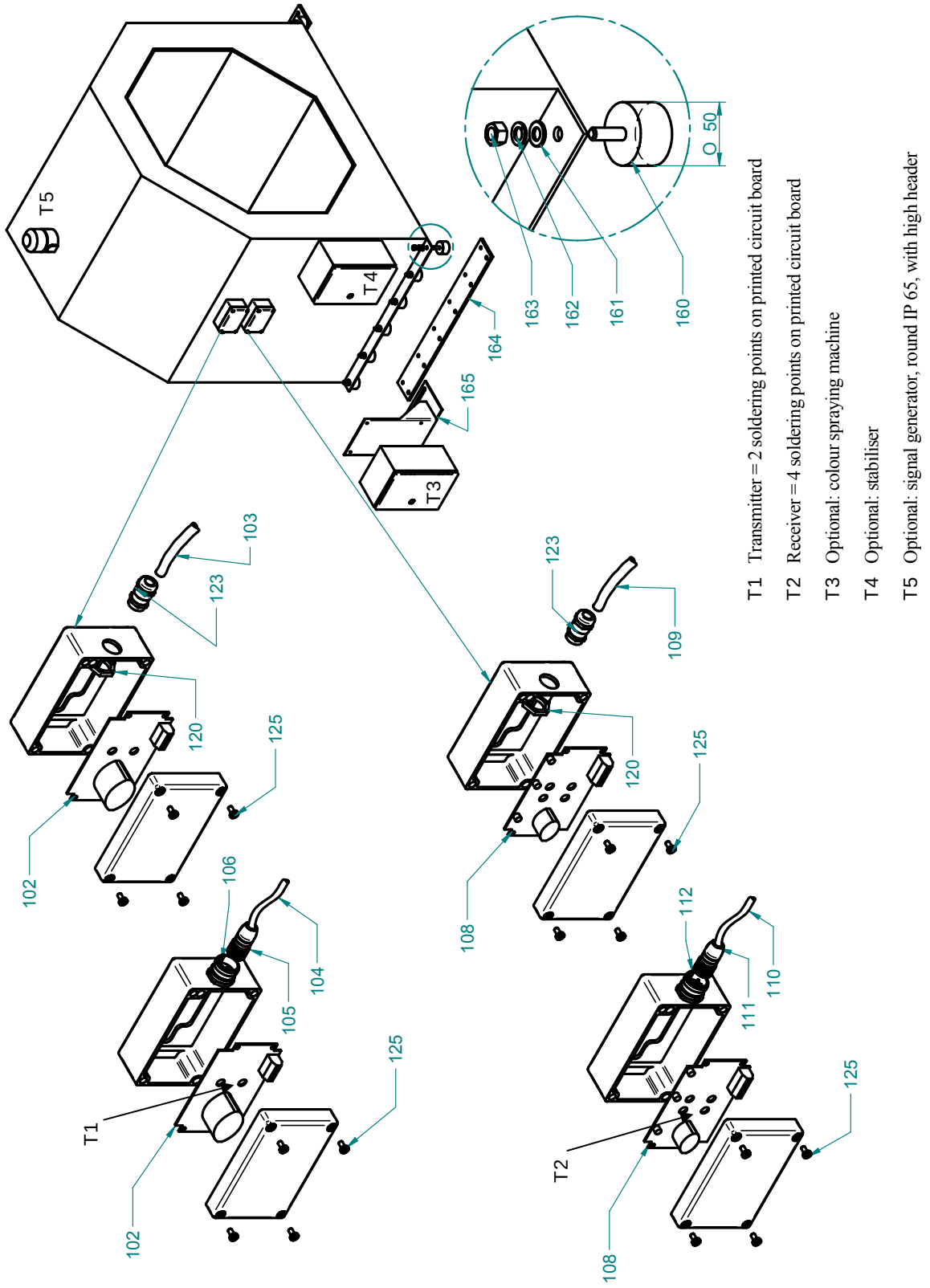
T1 Transmitter = 2 soldering points on printed circuit board

T2 Receiver = 4 soldering points on printed circuit board

T3 Check screw length!

Detector CO-Coil

Spare part drawing number: CO 0000 0000 002 EA



T1 Transmitter = 2 soldering points on printed circuit board

T2 Receiver = 4 soldering points on printed circuit board

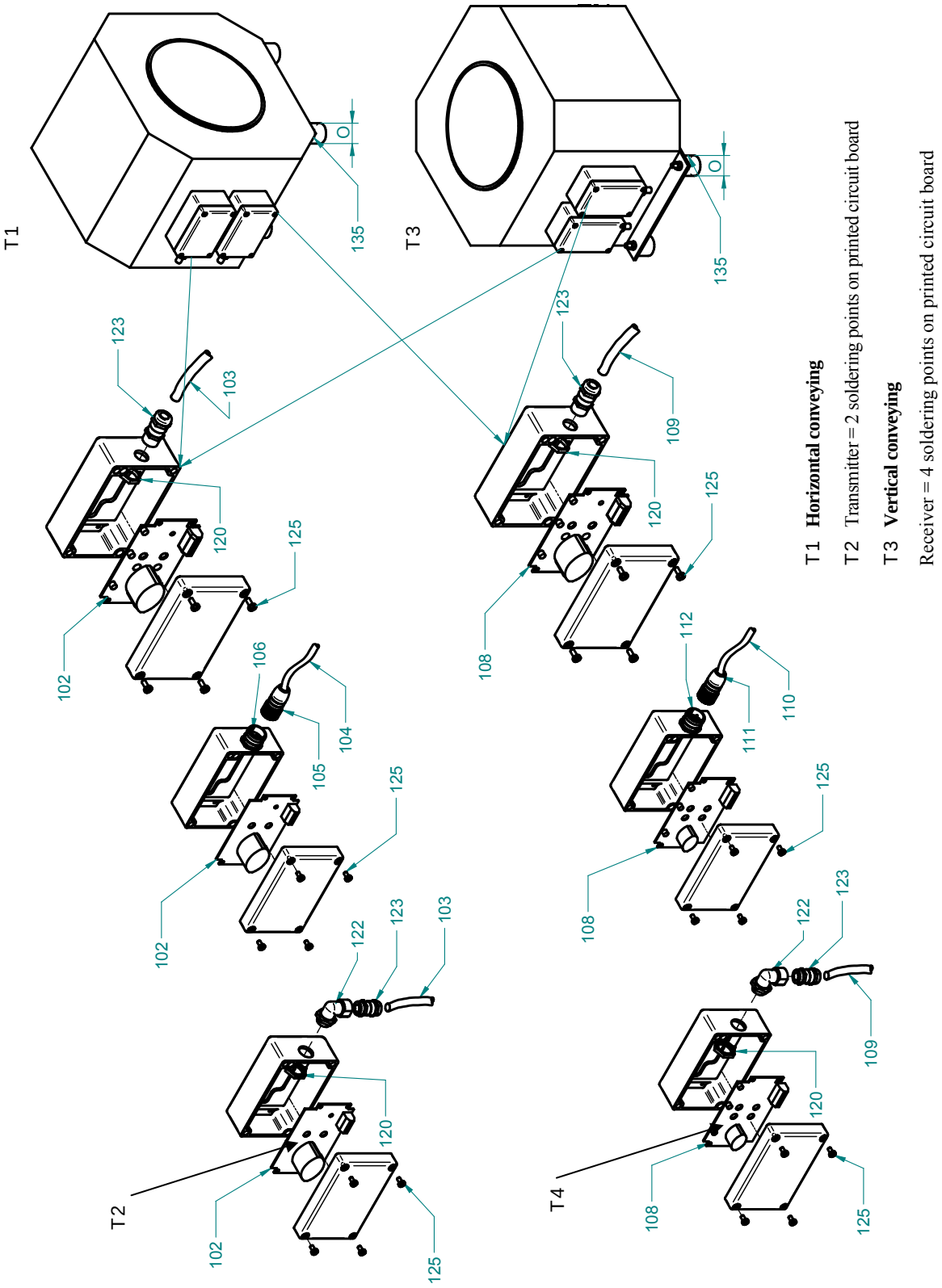
T3 Optional: colour spraying machine

T4 Optional: stabiliser

T5 Optional: signal generator, round IP 65, with high header

Detector CR-Coil

Spare part drawing number: CR 0000 0000 001 EA



T1 **Horizontal conveying**

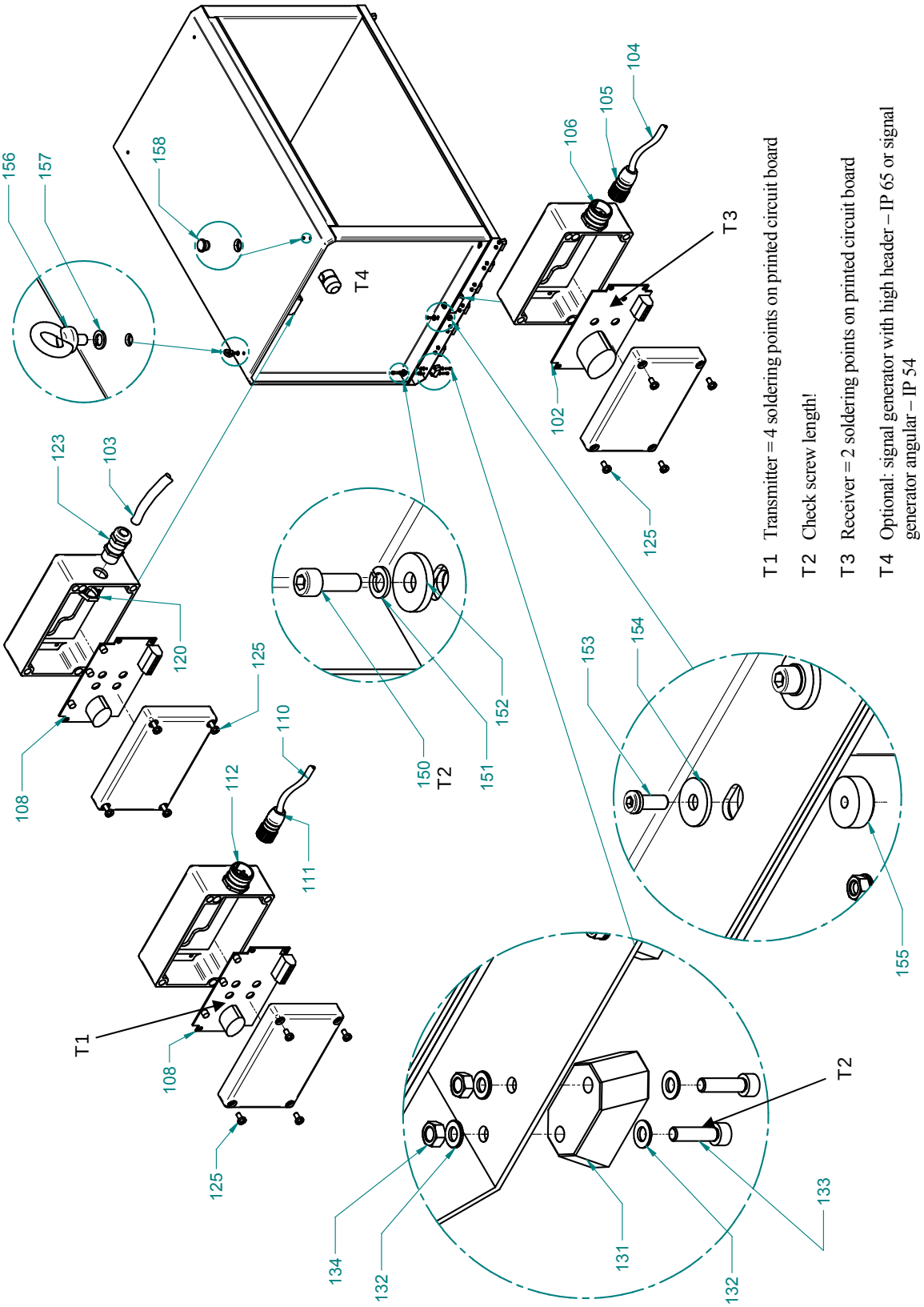
T2 Transmitter = 2 soldering points on printed circuit board

T3 **Vertical conveying**

Receiver = 4 soldering points on printed circuit board

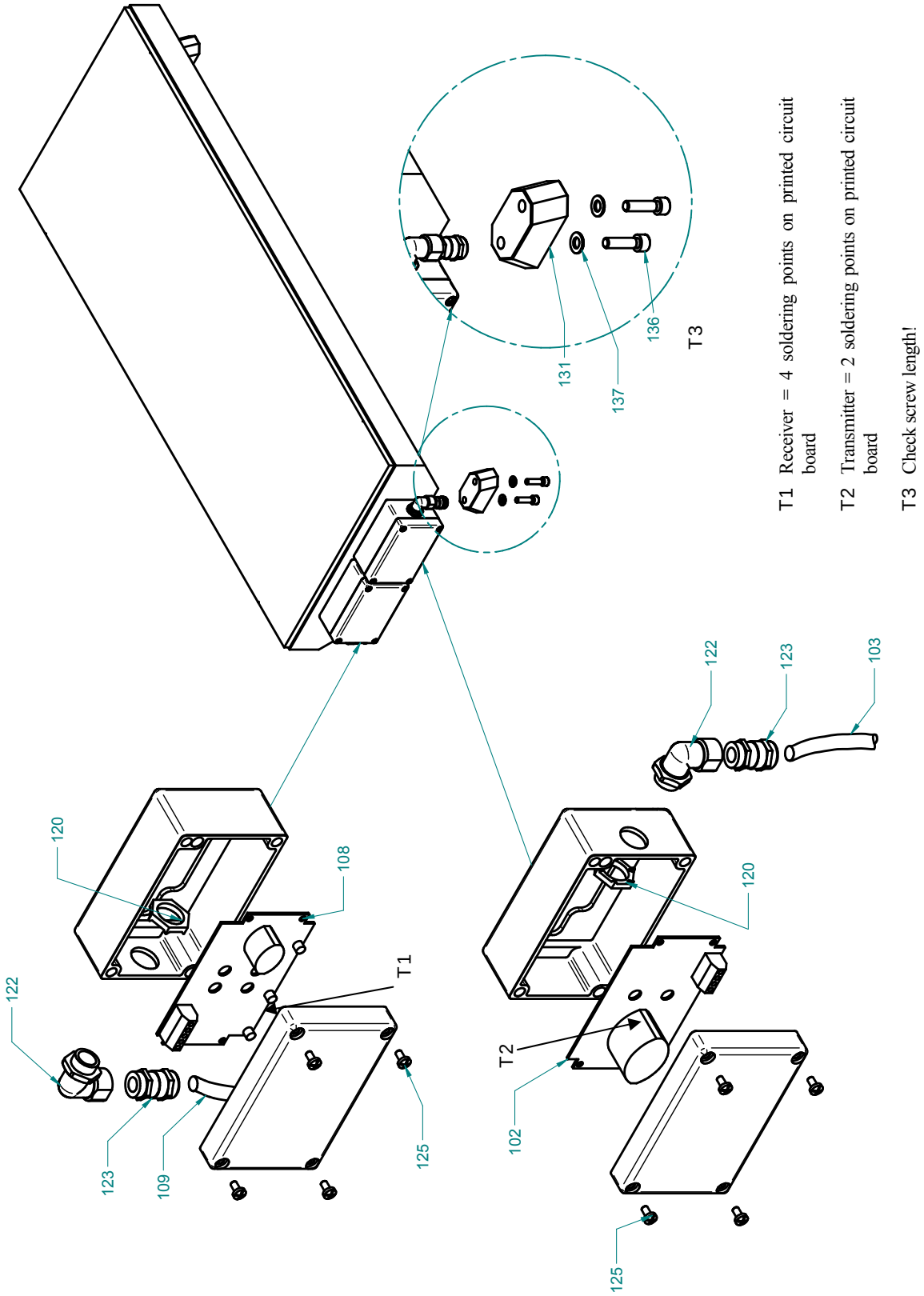
Detector D-Coil BA 2.1

Spare part drawing number: D 0000 012 E Rev 00



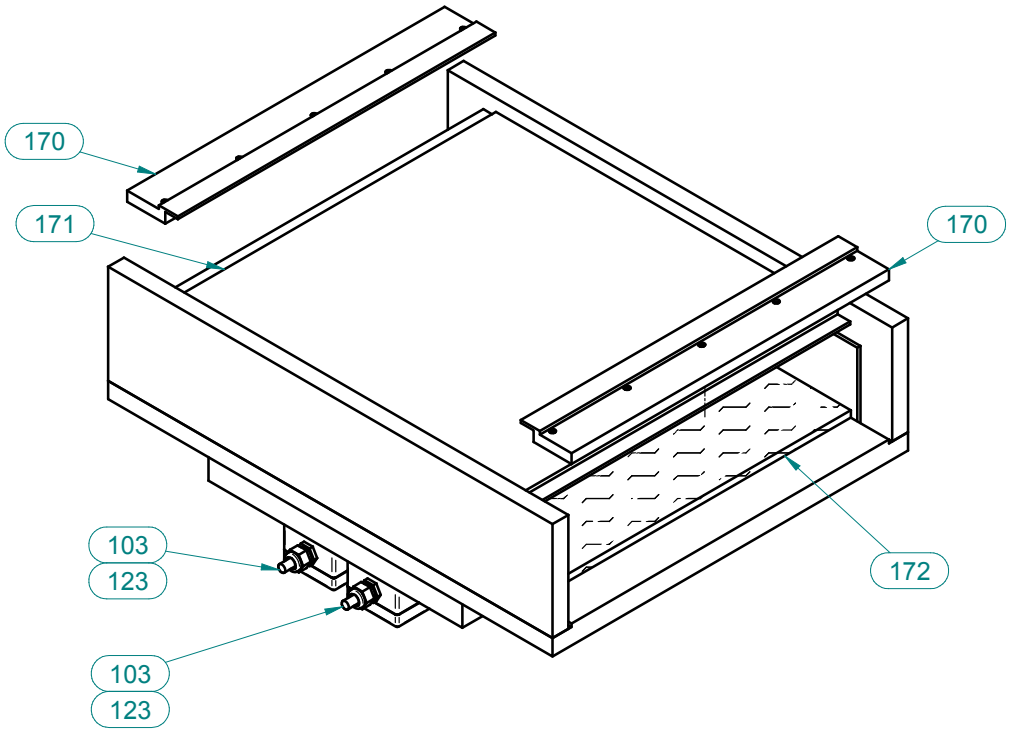
Detector S-Coil

Spare part drawing number: S 0200 0000 003 EA



Detector VT- Coil – BA 3.01

Spare part drawing number: VT 0000 002 EX



Detector C/CO/CR/D/S/VT-Coil

Spare part list: GB-MD.007

Ref.-nr.	Spare part	Item.-No.	Comment
102	Transmitter circuit complete with components	350 281[1)]	State the detector serial no.
103	Transmitter connector cable, not pluggable	*	State length
104	Transmitter connector cable, pluggable (with cable plug)	*	State length
105	6-pin cable plug for transmitter cable, brass	200 381	
106	6-pin flange socket for transmitter casing, brass	200 380	
108	Receiver electronics, fully equipped	350 282 [1)]	State the detector serial no
109	Receiver connector cable, not pluggable	*	State length
110	Receiver connector cable, pluggable (with cable plug)	*	State length
111	6-pin cable plug for receiver cable, brass	200 379	
112	6-pin flange socket for receiver casing, brass	200 378	
120	Counter-nut M 16 x 1,5 brass – EMV	301 656	
121			
122	Bolted angular joint M 16 x 1,5 brass	301 868	
123	Bolted cable joint M 16 x 1,5 brass – EMV short thread– clamping range 5 to 9 mm	301 653	
125	Quick-action closure screw with coil spring (1 set = 4 pieces)	301 838	
130	Mounting feet	*	Detektortyp und Detektormaße angeben
131	Coil foot	301 714	
132	Disc DIN 125 – A 8,4 – galvanised	300 124	
133	Fillister-head screw DIN 912 M8 x 35 – galvanised	301 837	**Länge beachten!**
134	Hexagon nut DIN 985 – M8 – galvanised (self-locking nut)	300 697	
135a	Rubber metal ∅ 25	300 044	
135b	Rubber metal ∅ 40	300 164	

Ref.-nr.	Spare part	Item.-No.	Comment
136	Fillister-head screw DIN 912 M8 x 30 – A2	301 718	**Check length!**
137	Base disc DIN 125 – A 8,4 – A2	301 290	
150	Fillister-head screw DIN 912 – M10 x 30 - galvanised	300 088	**Check length!**
151	Spring washer DIN 127 – A 10 – galvanised	300 774	
152	Base disc Øi=11; ØA=34; s=5	301 150	
153	Fillister-head screw DIN 7984 – M8 x 20 – galvanised (with inner torx)	300 116	
154	Disc DIN 440 – R9 – galvanised (Øi=9; ØA=28; s=3)	300 113	
155	Centring pin	300 636	
156	Eye bolt DIN 580 - M 12 - galvanised	300 058	
157	Disc (PA) $\varnothing_i$ = 13, polyamide	300 057	
158	Plug M 12 x 1,5, DIN 13	300 041	
160	Rubber metal Ø50	300 208	
161	Disc DIN 125 – A 10,5 – galvanised	300 125	
162	Spring washer DIN 127 – A 10 – galvanised	300 774	
163	Hexagon nut DIN 934 – M 10 – galvanised	300 082	
164	Mounting plate	*	
165	Fastener for pneumatics casing (mounting angle)	250 548	
170	Clamping rail	*	
171	Wearing plate	*	
172	Damping rubber	*	

[1] Exchange only after consulting the Service Dept.

*** When ordering spare parts, please be sure to quote serial number and device type or order confirmation number and type!!!**

All consumable parts are excluded from the warranty (i.e. moved parts and/or parts in contact with the product)!

Only original spare parts made by the manufacturer may be used.

The warranty will become null and void in the case of non-compliance!

Appendix

11

Access codes

Please keep this number in a safe place and do not give it to unauthorized persons!

Operating level 1:	**2484**
Operating level 2:	**2314**
Operating level QM:	**2077**
Codenumber Reset	**1379**
Codenumber Test	**7931**

Card reader (optional)

If you run your metal detector with the optional card reader, you will have to reset metal signals by means of the card reader's reset button. Manual reset is possible only if there is, at the same time, a **Key Card** in the frequency area of the card reader. The data (number of the **Key Card**, time, date) of every manual reset will be collected by the electronics and a maximum of 20 data records will be stored. If the maximum number of entries is reached, the eldest entry will be replaced by the current one. The stored entries may be retrieved or printed

see chapter **Adjustment → Operating level 2 → Card reader**

The configuration of the **Key cards** is also done in **Adjustment → Operating level 2 → Card reader.**

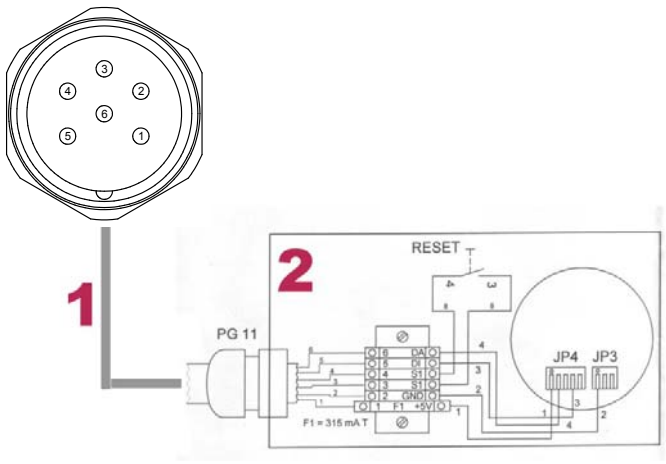
Please note that his option is possible only for **"Reset manual"**

see chapter **Adjustment → Operating level 2 → Reject parameter → Reset mode**

1. Card reader
2. Reset-Button
3. Frequency area of card reader

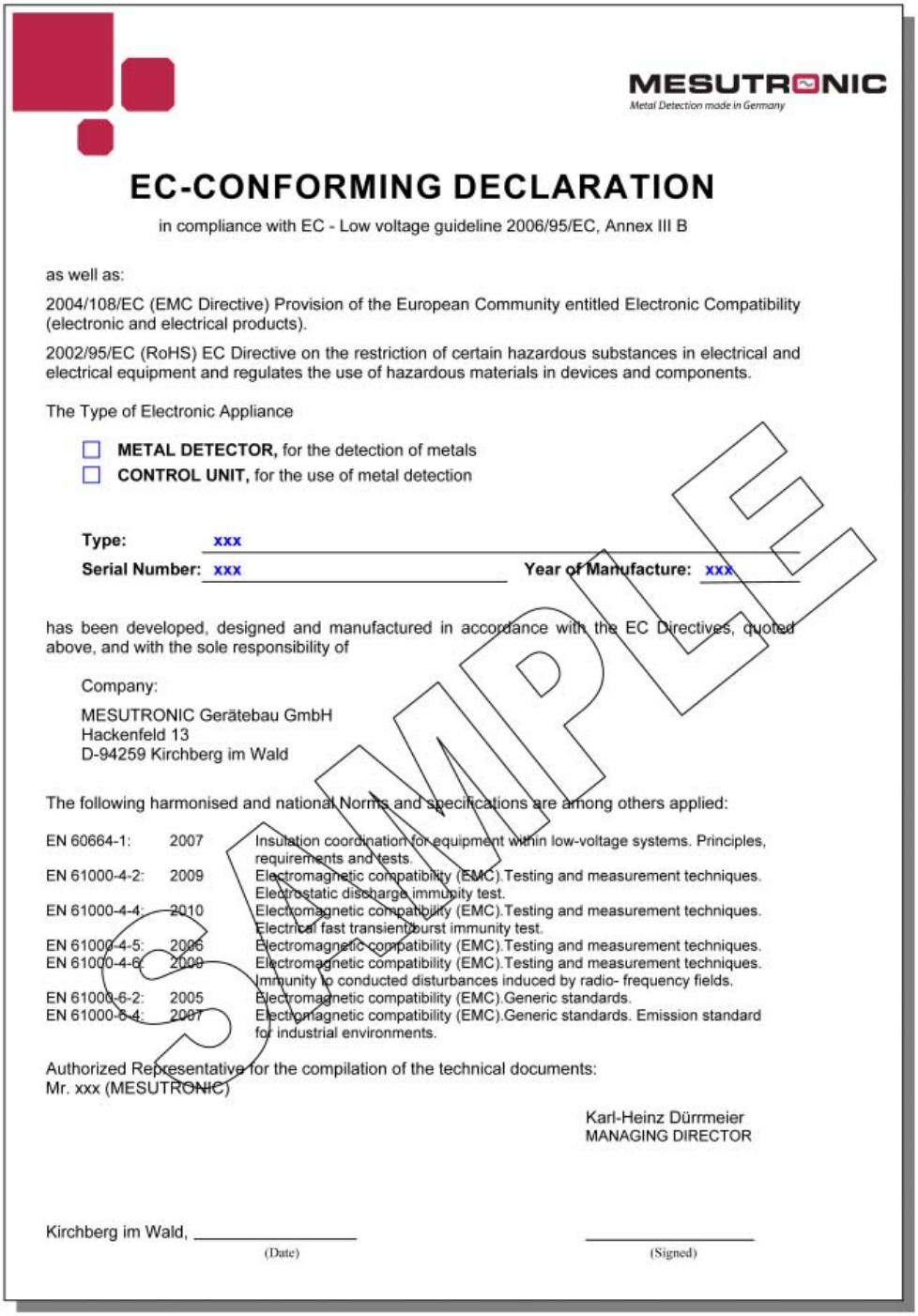
Please note:

The electronics software and hardware are factory pre-set for the use of a card reader. If you have to reconfigure the cable due to installation reasons, please connect it as follows



1. Cable (7 x 0,75 qmm) are to be wired 1:1 with the connector on the adaptor plate of the electronics casing.
2. Card reader

Example of an EU Declaration of Conformity



MESUTRONIC
Metal Detection made in Germany

EC-CONFORMING DECLARATION

in compliance with EC - Low voltage guideline 2006/95/EC, Annex III B

as well as:

2004/108/EC (EMC Directive) Provision of the European Community entitled Electronic Compatibility (electronic and electrical products).

2002/95/EC (RoHS) EC Directive on the restriction of certain hazardous substances in electrical and electrical equipment and regulates the use of hazardous materials in devices and components.

The Type of Electronic Appliance

- ☐ **METAL DETECTOR,** for the detection of metals
- ☐ **CONTROL UNIT,** for the use of metal detection

Type: xxx

Serial Number: xxx **Year of Manufacture:** xxx

has been developed, designed and manufactured in accordance with the EC Directives, quoted above, and with the sole responsibility of

Company:

MESUTRONIC Gerätebau GmbH
Hackenfeld 13
D-94259 Kirchberg im Wald

The following harmonised and national Norms and specifications are among others applied:

EN 60664-1:	2007	Insulation coordination for equipment within low-voltage systems. Principles, requirements and tests.
EN 61000-4-2:	2009	Electromagnetic compatibility (EMC).Testing and measurement techniques. Electrostatic discharge immunity test.
EN 61000-4-4:	2010	Electromagnetic compatibility (EMC).Testing and measurement techniques. Electrical fast transient/burst immunity test.
EN 61000-4-5:	2006	Electromagnetic compatibility (EMC).Testing and measurement techniques.
EN 61000-4-6:	2009	Electromagnetic compatibility (EMC).Testing and measurement techniques. Immunity to conducted disturbances induced by radio- frequency fields.
EN 61000-6-2:	2005	Electromagnetic compatibility (EMC).Generic standards.
EN 61000-6-4:	2007	Electromagnetic compatibility (EMC).Generic standards. Emission standard for industrial environments.

Authorized Representative for the compilation of the technical documents:
Mr. xxx (MESUTRONIC)

Karl-Heinz Dürrmeier
MANAGING DIRECTOR

Kirchberg im Wald, _____
(Date)

_____
(Signed)

SAMPLE